CHAPTER 3

CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the physical, biological, social and economic characteristics of the El Malpais Planning Area that may be affected by the actions proposed under the alternatives identified in Chapter 2. Much of the information in this chapter summarizes more detailed materials contained in the *Rio Puerco Resource Area Management Plan* (RMP--USDI, BLM 1986). These materials are available for review at the Albuquerque Field Office.

General Physical Setting

Climate in the Planning Area is typically temperate, hot in the summer and cool in the winter. Precipitation averages 12 inches annually, with August being the wettest month (average 2.5 inches) and April or May the driest (0.35 to 0.42 inches). Daily temperatures can vary by 50 degrees or more. The highest daily average temperatures occur in July at 70 degrees Fahrenheit (◦F), while the lowest daily averages occur in January at 32◦F (Roybal, et al. 1984).

The Planning Area contains a wide assortment of geological formations that are important for scenic enjoyment, recreation, education and scientific study. The Cebolla Wilderness, Spur and Breaks Units on the eastern side of the Planning Area (refer to Map 3 in Chapter 1) are dominated by sandstone mesas, canyons, and vertical sandstone escarpments. On the western side, the West Malpais Wilderness, Continental Divide Unit and Chain of Craters WSA are dominated by volcanic landscapes, including numerous cinder cones.

RECREATION & FACILITIES

Recreation

The NCA and Planning Area provide many diverse opportunities for recreation, both developed and dispersed. Some information on existing visitor use levels and patterns in the NCA has been collected at the El Malpais Information Center in Grants (no longer open), at the BLM Ranger Station, and at La Ventana Natural Arch. Records indicate that visitors come from a variety of places--all over the U.S., Albuquerque and Grants, Europe and other foreign countries. They include commercial truckers passing through on State Highway (NM) 117, vehicle campers, American Indians, cattle operators, mountain bikers, wilderness users and individuals engaging in other recreational pursuits. Developed recreation is dependent on managed recreation sites such as campgrounds, trailheads, and picnic areas, while dispersed recreation occurs over most of the Planning Area, independent of maintained facilities.

The cities of Grants and Milan are actively seeking economic benefits from the tourism industry to diversify local economies, and are supplying some developed recreational facilities. The Planning Area also provides recreational opportunities for citizens of two of the largest metropolitan areas in New Mexico, Albuquerque and Santa Fe. Population increases in these two cities are resulting in increased demand for recreation opportunities in the Planning Area.

Recreation visitation to the Planning Area and National Monument is projected to grow to about 207,600 people annually by the year 2000 (Madell 1988), although current visitation is about 65,000 people per year at the BLM's most heavily used sites. The expanding population in the southwestern United States, increased disposable income, more leisure time, and increased recreational vehicle ownership (especially of four-wheel-drive vehicles and mountain bikes) is increasing visitor use of the area (in both frequency and duration). Travel to and within the Planning Area continues to be primarily by private vehicle, but tour bus use is expected to increase. Most visitors stay on paved or well-graded roads, but some reach the less-traveled areas by primitive road, and a few hike into the back-country areas.

The types of recreation available on public lands in the Planning Area include but are not limited to camping, hiking, backpacking, picnicking, sightseeing of natural and cultural resources, photography, driving off-highway vehicles (OHVs), road and mountain bicycling, horseback riding, caving, climbing, cross-country skiing, hunting, pack-animal trips, trapping, target practice, and enjoying wilderness solitude (refer to Table 3-1).

TABLE 3-1

ESTIMATED RECREATIONAL USE OF THE EL MALPAIS NCA, FISCAL YEAR 1995

Activity	No. of Visitors (thousands)
Camping	10
Hiking	50
Picnicking	20
Sightseeing	60
Back-Country Driving	5
Hunting	6
Viewing exhibits at Ranger Station	15.6
Other [a]	30
Total [b]	65

Notes: [a] Includes road & mountain biking, horseback riding, skiing, shooting, trapping, caving, climbing, photography, & pack trips.
[b] This is not a grand total; visitors to the NCA engage in multiple activities during their visits.

Recreational opportunities depend on an area's setting and the kinds of activities that could take place. The existing network of roads determines how accessible different recreational opportunities are to the visitor. To evaluate the effect of access on these opportunities, the BLM uses a system referred to as the Recreation Opportunity Spectrum (ROS--refer to Appendix C for a summary). The ROS system provides a framework for classifying and defining types of outdoor recreation environments, activities, and experience opportunities. The Planning Area contains three of the six classes of opportunities, semi-primitive non-motorized, semi-primitive motorized, and roaded natural (refer to Table 3-2 and Map 6 in the map section before this chapter).

Of all the known and potential opportunities for recreation in the Planning Area, some of the most common are discussed below. The ROS classes and units in which the activity can or does occur are also included.

Camping opportunities in the Planning Area are generally at dispersed sites in all three ROS classes. Vehicle campers who want to have access to tables for meals are allowed to camp along the old roadbed of NM 117 at the southern end of The Narrows (also used as a picnic area). No camping is allowed at the Ranger Station or La Ventana Natural Arch. Camping is also discouraged in units with restricted access such as the Neck and Spur. Periods of heavier camping use occur in the back country during hunting and piñon-picking seasons.

TABLE 3-2

RECREATIONAL OPPORTUNITY CLASSES WITHIN THE PLANNING AREA (PA)

Area/Recreation Opportunity Spectrum (ROS) Class	Acreage [a]	% of PA/Unit
Planning Area		
Roaded natural	79,200	28
Semi-primitive motorized	85,000	30
Semi-primitive non-motorized	122,100	42
Totals	286,300	100
Cebolla Wilderness		
Roaded natural	9,000	15
Semi-primitive motorized	10,000	16
Semi-primitive non-motorized	43,000	69
Totals	62,000	100
West Malpais Wilderness		
Roaded natural	4,900	12
Semi-primitive motorized	2,400	6
Semi-primitive non-motorized	32,600	82
Totals	39,800	100
Chain of Craters WSA		
Roaded natural	7,800	43
Semi-primitive motorized	7,500	41
Semi-primitive non-motorized	3,000	16
Totals	18,300	100

Note: [a]Rounded to nearest hundred acres, including both public & private land.

Hiking is also a dispersed activity in the Planning Area that occurs in all ROS classes and units. However, some concentrated use is taking place; trails developed from high-use foot traffic now exist along the Narrows Rim Trail and on some old vehicle routes that extend into the West Malpais Wilderness and Cebolla Wilderness.

The diverse, broken terrain, variety of wildlife, dramatic vistas, and prehistoric and historical resources provide excellent viewing opportunities and destinations for hikers in the Cebolla Wilderness. Three key access points to this wilderness are located at La Ventana Natural Arch, The Narrows and the Dittert Site. The Hole-in-the-Wall of the West

Malpais Wilderness is a 6,000-acre kipuka (refer to the Glossary) that offers hikers and backpackers a rugged experience in lava terrain with watchable wildlife and remoteness.

The Continental Divide National Scenic Trail (CDNST) corridor crosses through the Planning Area. Approximately 25 miles pass through the Cerro Brillante, Chain of Craters, Continental Divide, Cerritos de Jaspe and Neck Units. Another 24 miles of the corridor cross private and National Monument lands. The BLM and volunteers have built rock cairns and posted signs to mark the public land portion of this trail. In the northern portion of the Chain of Craters WSA, 6 miles of the trail have been marked. In the Cerro Brillante Unit, 4.5 miles have been marked (from the southern boundary of the Chain of Craters WSA around Cerro Brillante, and connecting with CR 42). Two miles of marked treadway exist in the Cerritos de Jaspe Unit, and connect with the National Monument treadway at both ends.

La Rendija, a large crack in the old basalt flows, bisects the Cerro Brillante Unit and is a recreational/ interpretational opportunity, especially for hiking. When the CDNST is completed, its southern portion will pass near La Rendija (if the BLM can acquire an easement across private land in the Cerro Brillante-AFO Unit). Hiking and backpacking opportunities also exist in the Chain of Craters WSA, where scenic vistas and volcanic features are the main draw.

Opportunities for picnicking occur in areas of two ROS classes, the semi-primitive motorized and the roaded natural. Although picnicking can take place almost anywhere in the Planning Area, it usually occurs at the southern end of The Narrows, at La Ventana Natural Arch or along the roaded natural areas.

Sightseeing or driving for pleasure are activities in which most, if not all, visitors participate. Many visitors are on their way to another destination and stop by the Planning Area just to see what is there. Most known visitor use consists of sightseeing from vehicles on NM 117, and short walks into portions of the wilderness by day hikers and photographers, many of whom plan return trips. The units most used for these activities are the Neck, Cebolla Wilderness, Spur, Chain of Craters WSA, and Cerro Brillante. The ROS classes involved are roaded natural and (possibly) semi-primitive motorized.

The variety of vegetation and terrain exhibited by the various units of the Planning Area provides a unique visual experience for NCA travelers. Particularly outstanding are the contrasts between dramatic variegated buff and pink sandstone cliffs with ponderosa pines clinging to crevices, open grassland meadows interspersed with piñon-juniper woodlands, and expansive black lava flows covered with stunted conifers. A series of volcanic cinder cones in the Chain of Craters Unit offers vantage points to view vast lava flows and distant sandstone cliffs to the east. County Road (CR) 42 runs from a high elevation where mixed conifer and piñon-juniper woodlands occur into a vast plain of gently rolling, grass-covered hills and swales formed by ancient lava flows. Occasional pronghorn antelope and seasonal, migrating waterfowl can be viewed from CR 42. Seasonal ponds attract waterfowl and shore birds to areas near the road and on public land.

Visitors who spend more than a few hours within the Planning Area usually drive along the back-country roads such as CR 42 and the Cebolla Canyon road. The Brazo, Cebolla Wilderness, Chain of Craters WSA, Continental Divide, Cerritos de Jaspe and Cerro Brillante are the units of choice for most back-country users. Two ROS classes, semi-primitive motorized and roaded natural, follow these back-country roads. The Planning Area's system of dirt roads offers the opportunity for mountain biking, horseback riding, and touring with high-ground-clearance vehicles. Access by these dirt roads may be limited due to impassable road conditions when the roads are wet. Another aspect that may limit access is land ownership; when access is limited, recreation potential is also limited. The number of visitors who reach remote locations in the Planning Area is unknown.

Hunting can occur on all public lands in the Planning Area, except where it is restricted by the BLM's Supplementary Rules for Recreation (USDI, BLM 1996) or New Mexico Department of Game & Fish (NMDG&F) regulations. Units where hunting most often occurs are the Cebolla Wilderness, West Malpais Wilderness, Chain of Craters WSA, Cerro Brillante, Brazo, Continental Divide and Cerritos de

Jaspe. The isolation of the back-country units offers greater opportunities for hunting success.

Mountain biking opportunities occur along roads in two ROS areas, semi-primitive motorized and roaded natural. Most mountain bike activity has occurred in the Cerritos de Jaspe, Brazo, Continental Divide and Cerro Brillante Units, and the Chain of Craters WSA. Because of the design of the equipment, road biking usually occurs along paved roads (NM 117 and NM 53), but is limited by the narrow travel corridor of portions of these two roads. Roads open to vehicle traffic provide the best opportunities for biking, as no mountain bike trails have been designated.

Opportunities for horseback riding are plentiful within the Planning Area, although the BLM does not know how much use is occurring. Units such as the Cebolla Wilderness, West Malpais Wilderness, Chain of Craters WSA, Brazo, Cerro Brillante and Cerritos de Jaspe are most conducive to horseback travel, which can occur in any ROS class. The rugged terrain of the Chain of Craters WSA and the West Malpais Wilderness sometimes makes travel by horseback much more comfortable than travel by vehicle.

Very few caves are known to exist in the Planning Area. These occur in the Cerritos de Jaspe, Continental Divide and Cerro Brillante Units, and the Chain of Craters WSA.

Climbing is an infrequent use that occurs along The Narrows. Other climbing opportunities may exist in the Cebolla Wilderness and Brazo Units. Climbing could occur in any of the three ROS classes.

The 35-mile long, Chain of Craters Back Country Byway follows CR 42 through the western portion of the Planning Area and was designated to encourage recreational travel to this area. Volcanic landscapes dominate this zone. The west side of the Planning Area is likely to be attractive to those interested in long day trips, with proper vehicles and overnight or more extended visits. (Note: CR 42 can be rough under dry conditions and impassable when wet. This situation affects access to the west side of the Planning Area and is reflected in the overall figures for annual visitation.)

Public lands within the Planning Area that are outside the NCA were previously privately owned, so no information about current recreational use is available. The recreational potential for and opportunities on these lands are similar to those on adjacent NCA lands.

Two recreational outfitters use the Planning Area, their use being stipulated in Special Recreation Permits issued to each. Both permittees also exercise their permits in other portions of Albuquerque Field Office lands for which planning has already been completed (USDI, BLM 1986).

Facilities

Multiple ownership of the Planning Area and surrounding lands affects facility development. BLM and U.S. Forest Service lands surround the National Monument, so no single agency provides for all types of recreational use in the area, and joint facilities can be used.

As required by P.L. 100-225, the BLM has constructed a Ranger Station for visitor services and resource protection in Section 32, T. 9 N., R. 9 W. (refer to Map 10). [An Environmental Assessment (EA) was prepared for the facility in 1990 under the Rio Puerco RMP.] The Ranger Station offers visitors a location in which to learn about the Planning Area through interpretive exhibits, a short video presentation and personal contact with BLM staff. The building also provides restroom facilities and access to drinking water. The facility is complete, except for construction of a short interpretive trail, and is universally accessible to all visitors (including those with disabilities).

One of the largest natural arches in New Mexico, La Ventana, is located in the Cebolla Wilderness along NM 117 and is highly accessible to visitors to the Planning Area. Annual visitor numbers for this site are estimated to be as high as 65,000 people. To stop resource damage and block illegal vehicle access to the Cebolla Wilderness, the BLM has built a parking lot at the arch with a capacity of 32 cars and 3 buses or recreational vehicles. The agency and volunteers have built a trail from the parking lot to the arch, two vault toilets, and interpretive wayside exhibits.

The Narrows, along NM 117, is being used for picnicking, camping, and parking for access to the Cebolla Wilderness, as no facilities can be constructed inside wilderness. The site is the old roadbed of what is now NM 117. Safety must be improved, because entering and exiting the site onto the existing highway is dangerous.

The site offers an opportunity for day use of the Cebolla Wilderness, which encompasses the sandstone bluffs and lava features, and contains appealing vegetation such as stunted ponderosa pines and a small prehistoric site. All these features are within a short walk from the highway and accessible at most visitors' skill level. The Narrows Rim Trail into the wilderness has a small sign and rock cairns at a few points along the treadway. Recurring use of the trail has created the treadway, while the BLM and volunteers have built the cairns.

Two gates have been installed within the Planning Area for horseback access. One gate is located near the Narrows Rim trailhead and provides access into the Cebolla Wilderness. The second gate is located at the northern end of the West Malpais cherry-stemmed road and provides access into the West Malpais Wilderness and Hole-in-the-Wall.

A variety of developed campgrounds, recreational vehicle camping areas, and motel accommodations exists within the region north of the Planning Area. Within 80 miles of Grants are 1,150 campsites, including federal, state and private facilities. The National Park Service (NPS) is proposing to develop a primitive camping area on the west side of the National Monument and the NCA (USDI, NPS 1990b). Primitive camping is permitted on most Planning Area lands. The areas near La Ventana Natural Arch and the Ranger Station are closed to camping.

INTERPRETATION

Interpretation is a resource management tool that connects visitors with resources, promotes understanding of ecosystems and cultures, reinforces visitor safety, and promotes resource management decisions. When managers wish to modify visitor attitudes and/or behaviors to protect or improve resources, they often use interpretive methods.

As the Planning Area becomes better known, increased use is expected. Future users will likely come from a great diversity of cultural, social, and economic backgrounds. This increased use will challenge the BLM effectively to provide interpretive and education services to a wider variety and greater numbers of the public.

The BLM educates and informs the public about the Planning Area mainly through brochures distributed throughout the community and the country, newspaper notices published in the region, highway signs posted on I-40, and word of mouth. The BLM also does public outreach by developing and maintaining contacts and cooperative agreements with teaching and research institutions, non-profit organizations, other state and federal agencies, and American Indian groups.

The BLM provides personal services at the Ranger Station. Some guided interpretive activities, walks, and caravans begin there, with topics ranging from American Indian uses of the land to wilderness ethics and geology. BLM staff lead hikes to petroglyphs, former habitation sites of American Indians and homesteaders, and along the Narrows Rim Trail. The EA for the Ranger Station calls for an interpretive orientation trail (the Ranger Station Nature Trail) up the mesa behind the building, but this has not yet been constructed.

ACCESS & TRANSPORTATION

About 76 miles of federal, state and county roads provide access to and within the Planning Area. I-40 (which forms the Planning Area's northern boundary) and two state highways passing through the area serve as the primary transportation access routes (refer to Map 18 in the section before this chapter). Vehicle access to the central, western, and southern portions of the Planning Area is gained from county roads. Public access along the eastern and portions of the western boundaries is restricted through two Indian reservations.

From I-40, NM 53 skirts the north-northwest edge of the Planning Area. Forest Roads 50 and 447, which serve the Zuni Mountains of the Cibola National Forest, traverse short distances of the Planning

Area before connecting with NM 53. NM 117 runs in a southwesterly direction from I-40 through the Planning Area's eastern side. CR 42, part of the BLM's National Back Country Byway program, links NM 53 and NM 117 as it passes through the southern and western portions of the Planning Area. CR 42 is classified as a Type II Back Country Byway, which is a road where travel by high-clearance vehicle is recommended. CRs 41, 102, and 103 provide access to the southern and southeastern edge of the Planning Area.

Tables 3-3 and 3-4 show the amount of traffic (in vehicles per day) that travels through the Planning Area on NM 117 (east side) and NM 53 (west side). In general, area traffic increased between 1986 and 1994 on both highways, with the heaviest traffic occurring on NM 53 near Grants. CR 42, which connects NM 117 and NM 53, receives a low volume of daily traffic and is often impassable during wet weather.

TABLE 3-3

ADJUSTED AVERAGE DAILY TRAFFIC (AADT)
ON NEW MEXICO HIGHWAY 117 AT & NEAR INTERSTATE 40, 1986 & 1994
(vehicles/day)

Location (on NM 117)	AADT	
	1986 [a]	1994 [b]
At I-40	206	2,090
York Ranch (near junction, NM 117 & CR41)	84	
At junction w/CR 42 (35 mi. south of I-40)		2,090

Notes: [a] Source of data: USDI, NPS 1990a & 1990b.
[b] Source of data: NMSH&TD 1996.

TABLE 3-4

ADJUSTED AVERAGE DAILY TRAFFIC (AADT)
ON NEW MEXICO HIGHWAY 53 NEAR GRANTS, 1986 & 1994
(vehicles/day)

Location (on NM 53)	AADT	
	1986 [a]	1994 [b]
Grants city limits	3,452	
Just south of Grants city limits		4,263
South of Grants (24 mi.)	409	
South of Grants (28 mi.)		1,740

Notes: [a] Source of data: USDI, NPS 1990a.
[b] Source of data: NMSH&TD 1996.

Connecting with the highways and county roads within the Planning Area are BLM-administered arterial, collector and local roads (refer to the Glossary). Roads inventoried include 356.5 miles open to public use (USDI, BLM 1996). Some of these also serve as access to private lands within the Planning Area. Though some routes receive intermittent maintenance, many are unimproved, requiring the use of a high-clearance vehicle when dry and becoming impassable when wet. Some off-highway vehicle users seek such challenges.

Off-highway vehicle uses are limited to existing roads and trails on 135,200 acres of the Planning Area's public land. Use of motor vehicles, mechanized equipment and other forms of transport are prohibited in the 100,800 acres of public land designated as wilderness, while such use is unrestricted on the remaining 12,000 acres. Of this 12,000 acres, 3,600 acres are designated as open to OHV use and the other 8,400 acres are undesignated through the land use planning process. BLM Socorro Field Office lands adjacent to the southeastern portion of the Planning Area are designated as open to OHV use, except for approximately 40 acres on which use is limited to existing roads and trails (USDI, BLM 1989d).

Within the Planning Area are 6.3 miles of designated vehicle routes outside wilderness that exist only for authorized users. Within the wilderness areas, 23.3 miles of routes are authorized for use by the BLM under the Wilderness Act and P.L. 100-225. These routes are available only for periodic access by those who maintain grazing management facilities, personnel needing access in emergencies, and property owners needing to reach private inholdings.

The Planning Area is open to horseback use with no restrictions. Bicyclists also can access the Planning Area using the existing vehicle road and trail network, except in the two designated wildernesses. No bike trails have been designated. Cross-country cycling is prohibited only in wilderness, but the Planning Area's rugged terrain and lava flows limit this activity elsewhere.

Access to the entire Planning Area also can be gained by hiking, although the rugged terrain in parts and the lack of water make this activity more difficult. No extensive trail system exists within the Planning Area. One constructed trail about ½ mile long leads from the parking lot to La Ventana Natural Arch. A short segment of this trail up to a viewpoint is paved to make it universally accessible (including to disabled visitors). The BLM Ranger Station, located 9 miles south of I-40 on NM 117, is also constructed to be universally accessible.

Another area popular for hiking is along the sandstone rim above The Narrows. At this area's south end, approximately 21 miles south of I-40 on NM 117, a hiker easily can scramble to the top of the rim. Following the Narrows Rim Trail (about 3 miles long) in a northerly direction leads to magnificent views of the lava and surrounding countryside, including La Ventana Natural Arch. The Narrows Recreation Site, which is located just outside the wilderness boundary, and the Narrows Rim Trail provide access for hiking and other primitive recreation activities in the Cebolla Wilderness.

Another way to access the Planning Area will be from the CDNST (refer to Map 18). The decision on CDNST location through this portion of central New Mexico was published in 1993 (USDA, FS). Within the Planning Area, three short trail segments have been marked in the Cerritos de Jaspe Unit (2 miles), the Chain of Craters WSA (6 miles), and the Cerro Brillante Unit (4.5 miles). No treadway or trail facilities have been constructed, although rock cairns have been built and signs posted on public land to mark the trail.

Under P.L. 100-225, the Secretary of the Interior must provide nonexclusive access to the NCA by American Indians for traditional cultural and religious practices, including the harvest of pine nuts. This access is to be consistent with the purposes and intent of the American Indian Religious Freedom Act and the Wilderness Act.

WILDERNESS

Introduction

The Planning Area contains two designated wildernesses and a WSA (refer to Map 2 in Chapter 1). The Cebolla Wilderness and the West Malpais Wilderness were established by the Congress through P.L. 100-225. This law also requires that the BLM

review the Chain of Craters WSA and submit a recommendation to the Congress on its suitability or nonsuitability for preservation as wilderness.

Since the initial wilderness inventory and study conducted under Section 603 of the Federal Land Policy and Management Act (FLPMA), the BLM has acquired several thousand acres within the Planning Area. The agency's policy is to maintain an inventory of all public lands that may possess wilderness characteristics, including those lands acquired through exchange, donation or other means. If they are roadless areas possessing wilderness characteristics, these lands are evaluated and studied for wilderness suitability. In the Planning Area, the lands being considered for wilderness designation are contiguous to the Cebolla Wilderness and have not been previously inventoried or studied.

Wilderness Management

Cebolla Wilderness

This wilderness, located on the east side of the Planning Area, consists of approximately 62,000 acres. The Cebolla Wilderness is comprised of four former WSAs (Piñon, Rimrock, Little Rimrock and Sand Canyon).

Since the area was designated, the BLM has acquired approximately 800 acres of surface estate within its boundaries. The wilderness still contains three small inholdings (two private, one Indian) amounting to slightly over 500 acres. About 10,500 acres of private mineral subsurface estate also exist as part of the Cebolla Wilderness. These inholdings, surface and subsurface, are high priorities for acquisition identified in the *El Malpais Land Protection Plan* (USDI, BLM 1989b).

The exterior boundary of the Cebolla Wilderness is defined by formerly private lands, roads and the boundary of the Acoma Indian Reservation (refer to Map 2 in Chapter 1). The western boundary parallels NM 117 until the highway turns southwest. The boundary then proceeds southeasterly along utility line rights of way and the Tank Canyon Road. Roads and intermittent streams define the southeastern margin of the wilderness. The eastern boundary is generally defined by the top of Cebollita Mesa, which marks the edge of the Acoma Reservation, and the northern boundary is formed by a block of Acoma lands. BLM Road 2003 divides the northern and southern portions of the Cebolla Wilderness. The wilderness boundary is set back 100 feet from the apparent centerline of this graded road.

The Cebolla Wilderness contains a diversity of resource values that are manifested in unique visual qualities and a rich and varied wildlife habitat. Visitors have opportunities to view varied wildlife within several closely located scenic areas. Broken terrain, wildlife, vistas, and prehistoric and historical resources provide outstanding opportunities for recreational experiences including hiking, photography, backpacking, and primitive camping.

All 62,000 acres of the Cebolla Wilderness have been classified according to the ROS inventory and classification system (refer to Appendix C). About 43,000 acres (69 percent) of the wilderness are classified as semi-primitive non-motorized (refer to Table 3-2). The roaded natural and semi-primitive motorized classifications apply to wilderness lands near roads along the boundary.

The numbers and distribution of visitors in the wilderness are not yet completely documented. The majority of the known visitor use, as observed during BLM patrols, consists of sightseeing from vehicles on NM 117 and short walks into the northern portion of the wilderness by day hikers and photographers. Some use occurs in the southern end, mainly by hunters and visitors to the Dittert Site, but this portion of the wilderness is not as readily accessible. Key access points to the Cebolla Wilderness are La Ventana Natural Arch, The Narrows, Cebolla Canyon, Armijo Canyon and the Sand Canyon cherry-stemmed road.

The numerous canyons, mesas, ridges, and broad valleys that characterize the unit support a complicated pattern of open areas, ponderosa forests, piñon-juniper woodlands and grasslands. The high mesas provide vistas of volcanic fields extending for long distances. Sandstone bluffs and ridges rise above broad grassy valleys and alluvial fans. Visitors can find isolation from the sights and sounds of others in the broken and rugged terrain of the area.

La Ventana, one of the largest natural sandstone arches in New Mexico, is located in the Cebolla Wilderness just east of NM 117. The arch, which is

visible from the highway, attracts people driving by and is within a short walk from the highway pullout and parking area. Along The Narrows, NM 117 is pinched between vertical sandstone cliffs and the surreal landscape of the lava flows, providing a spectacular drive for visitors traveling through the area. Southwest of The Narrows, the landscape broadens out into a flat meadow formed by the mouth of Cebolla Canyon. Here, seasonal clusters of gold and pink wildflowers provide appealing visual displays for highway travelers.

Wildlife species have benefitted from the varied habitats available within the wilderness. The mixed landscapes of the unit have created habitat edges where ecotypes have mixed and supported many wildlife species. The rimrock country and vertical sandstone escarpments are prime raptor nesting habitat. Birds of prey in the area include golden eagles, red-tailed hawks, prairie falcons and great horned owls, with peregrine falcons migrating through. Large mammals include mule deer, bears, coyotes, bobcats, foxes, and occasional mountain lions. The broad valleys support reptiles and many small mammals such as prairie dogs and badgers.

However, many vegetative communities in the wilderness are becoming stagnant or deteriorated. Human use and climate changes have altered the mix of plant species as well as their location. The more open grasslands have changed to grass-shrub communities and piñon-juniper woodlands. Additionally, woody species (primarily piñon and juniper trees) have increased in the ponderosa pine communities, decreasing the open parkland acreage. As the vegetative health of these crowded areas declines, the likelihood of disease, pestilence and fire increases.

The practice of suppressing natural fires has played a part in this change in vegetative communities, also resulting in increased fuel loads, increased soil erosion, and a loss of ecosystem and biological diversity. Before the 1800s, natural fires would occur about every 2 to 3 years, burning with a lower intensity in smaller patches. Now such fires have the potential to burn with a higher intensity, making them more difficult to control.

The Cebolla Wilderness contains nationally significant archeological sites in extremely high densities. Most of them belong to the prehistoric Pueblo Chacoan system or the related but more recent Acoma Cultural Province, but range in age from PaleoIndian (10,000 years ago) to historical. In addition, this area was an interface between the prehistoric Anasazi (Pueblo) culture to the north and the prehistoric Mogollon culture to the south.

The Dittert Site is a prehistoric community center with a Chacoan building, great kiva, and prehistoric roads located just inside the wilderness boundary at the mouth of Armijo Canyon. This site is listed on the National Register of Historical Places. Other key cultural resource properties that are wholly or partially within the Cebolla Wilderness are the Pinole Site and the Cebolla Canyon Community, which includes The Citadel. These are both large, fortified, Late Pueblo III aggregated villages. Petroglyphs and pictographs dating to Anasazi times also occur within the area.

The entire Cebolla Wilderness lies within areas claimed by Acoma Pueblo, the Hopi Tribe and the Navajo Tribe on the basis of traditional land use. In addition, portions of the area are claimed by the pueblos of Zuni and Laguna (Akins 1993).

The Acomas continue to maintain shrines within the area, and use it for other traditional cultural practices such as gathering herbs and hunting. The occurrence of several sweatlodges in the unit indicates Navajo use, which also includes hunting and piñon harvesting. Ongoing Laguna and Zuni uses of the Cebolla Wilderness have not been documented.

A number of well-preserved historical homestead sites are also found in this wilderness. These structures, which were generally used between 1920 and 1960, offer glimpses into a rural, self-sufficient way of life.

The Cebolla Wilderness overlaps three grazing allotments, El Malpais (#203), Los Pilares (#205), and Techado Mesa (#209--refer to Table 3-5 and Map 23 in the map section). A total of 7,530 Animal Unit Months (AUMs) are permitted in the wilderness.

Range improvements in the wilderness include fences, dirt tanks, pipelines, troughs, a windmill, and a spring development (refer to Map 33). Portions of

TABLE 3-5

GRAZING ALLOTMENTS
OVERLAPPING THE CEBOLLA WILDERNESS

Allotment Name	No.	Total Acres (public land)	Acres in Wilderness (public land)	%Acres Within Wilderness	Total AUMs	AUMs in Wilderness	%AUMs Within Wilderness
El Malpais	203	136,200	49,200	30	16,906	6,365	38
Los Pilares	205	15,700	9,400	60	1,761	1,060	60
Techado Mesa	209	35,100	2,900	8	4,765	426	9
Totals		187,000	61,500	33	23,690	7,530	32

one pipeline system are located in the southeastern portion, while the other improvements are scattered throughout the wilderness.

P.L. 100-225 allows livestock grazing to continue within the Cebolla Wilderness in accordance with House Report 96-617 (Section 5, "Grazing in National Forest Wilderness Areas"). Range allottees within this wilderness are operating under a Range Improvement Maintenance (RIM) Plan and EA No. NM-017-89-31 (USDI, BLM 1990a; on file at the Albuquerque Field Office). The RIM Plan is the basis (through pre-authorization) for how, where, when, and by what methods range improvement maintenance using motorized equipment, motor vehicles, or other forms of mechanical transport is permitted within the wilderness. The plan also identifies authorized vehicle routes the allottees may use to access improvements.

BLM staff conduct on-the-ground patrols of the wilderness on a regular basis. These patrols provide opportunities for contacting and educating visitors about wilderness, as well as deterring use violations. Staff members record incidents of unauthorized use and visitor numbers, and monitor authorized uses. Signs have been placed around the wilderness to mark its boundary, and at previously used vehicle access points to inform visitors that the area is closed to motor vehicles, motorized equipment, bicycles and mechanical transport.

West Malpais Wilderness

This wilderness is located in the central portion of the Planning Area, as shown on Map 3 in Chapter 1. It consists of about 39,800 acres.

The West Malpais Wilderness is predominantly natural and exhibits outstanding opportunities for primitive and unconfined recreation. Human impacts consist of temporary disturbances of soil and vegetation in camp areas, and longer-term effects from livestock grazing improvements and access routes. Wilderness supplemental values include ecological complexity (where older basalt flows meet with more recent flows), scenic values, a variety of reptiles, antelope habitat, many species of birds, diverse lichens with research potential, and playa lakes.

This wilderness contains both federal and private surface and subsurface. When designated as wilderness in 1987, the area contained approximately 25,600 acres of private subsurface. By the end of 1995, the BLM had acquired all of this, except for about 500 acres in four parcels. The private surface inholdings (T. 7 N., R. 13 W., Sections 22 and 26) have been subdivided for cabin sites, and access crosses approximately 3/4 mile of Section 27, T. 7 N., R. 13 W. Several of the landowners have expressed interest in selling or exchanging their property.

For most of its length, the wilderness boundary either parallels roads or adjoins the National Monument boundary. Most of the National Monument has been found to possess wilderness characteristics and values; 86,267 acres have been identified as suitable for wilderness (USDI, NPS 1990a). Therefore, activities within the monument are not likely to degrade the quality of the wilderness experience for visitors to the West Malpais. Where the wilderness is bounded by CR 42 and a graded road, the boundary setback is 100 feet from the apparent centerline of the roads.

A graded road is "cherry-stemmed" out of the southeastern portion of the wilderness. This road travels in a northwesterly direction through Sections 2, 11, and 12 (T. 6 N., R. 12 W.) for approximately 2 miles to the intersection with the northern boundary of Section 2 (T. 6 N., R. 12 W.), where the wilderness boundary crosses the cherry-stemmed road.

The West Malpais Wilderness contains diverse resource values, including visual resources, various plant and animal species. Varied viewscapes are available to those visiting the wilderness. Volcanic plains form a low rolling terrain that offers broad, distant panoramas of volcanic fields, sandstone bluffs and ridges, and cinder cones.

The open panoramas without evidence of human imprint give the user a sense of isolation and solitude. Flowing, rolling, gently sloping lines dominate the near terrain and contrast with the broken lines of the more recent lava flows. This rolling terrain provides topographic screening that can buffer different user groups from each other.

Where older basalt flows meet with more recent flows, an ecological "edge effect" can be seen in the vegetation. This particular characteristic in the West Malpais Wilderness consists of a border of tall ponderosa pine undergrown with grasses, shrubs and piñon trees. This species combination or ecosystem does not occur elsewhere in this wilderness and supports wildlife diversity, particularly of birds and reptiles.

The lava soils and outcrops support at least 70 species of lichens of varied colors and textures. The diversity of these lichens is potentially interesting for research as well as being attractive to visitors. Lichen not yet classified may be present. A wide variety of cacti also exists.

The rolling, open prairie of grasses and shrubs supports antelope, which can often be sighted along CR 42. Wilderness designation provides some additional protection for these animals because motor vehicle use is not allowed. The prairie is also home to coyotes, jackrabbits, a variety of reptiles, and many species of birds not found in other types of habitats. These include open grassland birds such as sage sparrows, savannah sparrows, horned larks, grasshopper sparrows, harrier hawks, quail and burrowing owls. During rainy seasons, the old lava flows create numerous playa lakes that provide breeding grounds for invertebrates and amphibians, and make attractive loafing areas for a wide variety of birds, including migratory waterfowl.

An arm of the West Malpais Wilderness is Hole-in-the-Wall, an island ("kipuka") of ancient vegetated basalt flows surrounded by more recent flows (refer to Map 10). This area has figured both in legends and in western literature and probably will continue to attract hikers and overnight campers. Elk, deer, and antelope have been sighted in Hole-in-the-Wall. Abert's squirrels and many kinds of birds are also found there.

However, many vegetative communities in the wilderness are becoming stagnant or deteriorated. Human use and climate changes have altered the mix of plant species as well as their location. The more open grasslands have changed to grass-shrub communities and piñon-juniper woodlands. Additionally, woody species (primarily piñon and juniper trees) have increased in the ponderosa pine communities, decreasing the open parkland acreage. As the vegetative health of these crowded areas declines, the likelihood of disease, pestilence and fire increases.

The practice of suppressing natural fires has played a part in this change in vegetative communities, also resulting in increased fuel loads, increased soil erosion, and a loss of ecosystem and biological diversity. Before the 1800s, natural fires would occur about every 2 to 3 years, burning with a lower intensity in smaller patches. Now such fires have the potential to burn with a higher intensity, making them more difficult to control.

The ROS class for about 32,600 acres (82 percent) of the West Malpais Wilderness is semi-primitive non-motorized (refer to Table 3-2, Maps 3 and 6). The area offers opportunities for hiking, photography, backpacking, wildlife viewing and primitive camping. Opportunities for motorized use exist on non-wilderness lands adjacent to boundary roads.

The wilderness is overlapped by portions of four grazing allotments, Cerritos de Jaspe (#201), El Malpais (#203), Cerro Brillante (#207) and Los Cerros (#210--refer to Map 23). Of the total 26,914 AUMs permitted for use on these allotments, 5,018 AUMs are within the 39,300 acres of public land in the wilderness (refer to Table 3-6).

Range improvements in the wilderness include fences, dirt tanks, pipelines, troughs, windmills, corrals, and a line camp that includes a bunkhouse and corrals (refer to Map 34). The pipeline systems are buried in the western portion of the wilderness. The line camp is located in the southeastern corner, while the other improvements are located throughout the wilderness.

P.L. 100-225 allows livestock grazing to continue within the West Malpais Wilderness in accordance with House Report 96-617 (Section 5, "Grazing in National Forest Wilderness Areas"). Range allottees within this wilderness are operating under a RIM Plan and EA No. NM-017-89-25 (USDI, BLM 1990c--on file at the Albuquerque Field Office). The RIM Plan serves as the basis (through pre-authorization) for how, where, when, and by what methods range improvement maintenance using motorized equipment is allowed within this wilderness. The plan also identifies authorized vehicle access routes the allottees may use to access improvements.

Regular on-the-ground patrols of the wilderness are conducted by BLM staff, who record incidents of unauthorized use, number of visitors, and monitor authorized uses. These patrols provide opportunities for contacting and educating visitors about wilderness, as well as deterring use violations.

No trailheads, parking areas or trails have been constructed for accessing the West Malpais Wilderness. Vehicle access routes used before wilderness designation are being used to a limited extent for hiking and horseback riding. One primary access point is near the end of the cherry-stemmed road in the southeastern corner, where visitors park and enter the wilderness using an old vehicle route through the lava. Hole-in-the-Wall is their primary destination.

TABLE 3-6

GRAZING ALLOTMENTS
OVERLAPPING THE WEST MALPAIS WILDERNESS

Allotment Name	No.	Total Acres (public land)	Acres in Wilderness (public land)	% Acres Within Wilderness	Total AUMs	AUMs in Wilderness	%AUMs Within Wilderness
Cerritos de Jaspe	201	20,000	900	5	1,497	126	8
El Malpais	203	136,200	28,700	21	16,906	3,567	21
Cerro Brillante	207	21,800	2,300	11	3,087	336	11
Los Cerros	210	40,100	7,900	20	5,424	989	18
Totals		218,100	39,300	18	26,914	5,018	19

Wilderness Suitability

Chain of Craters WSA

The Chain of Craters WSA is located within the western portion of the Planning Area (refer to Map 3 in Chapter 1). This WSA contains approximately 18,300 acres of publicly owned surface administered by the BLM, and no private surface. [Note: The acreage discrepancy between this figure and the 17,468 acres referred to in P.L. 100-225 results from more accurate compilations through the use of computerized Geographic Information Systems.]

The Chain of Craters wilderness suitability study is required by P.L. 100-225. The results of the study are included in a *Wilderness Analysis Report* (refer to Appendix I) and summarized below. The final wilderness recommendation coming from this study will be made through the Secretary of the Interior to the President followed by Congressional action. Only the Congress can designate the area as wilderness or release it from the wilderness review process. In the meantime, the BLM is managing the Chain of Craters WSA under the *Interim Management Policy for Lands Under Wilderness Review* (USDI, BLM 1995).

Existing Resources & Environment

The Chain of Craters gets its name from a series of volcanic cones and craters aligned along a large-scale zone of structural strain adjacent to the Continental Divide in the western portion of the Planning Area. The cones formed as volcanic debris was ejected from vents and built up steep-sided slopes. Many of the cones have collapsed along one side.

No perennial streams flow within the Chain of Craters. Unnamed ephemeral streams drain east and south away from the cinder cones into low-lying basins near the boundaries of the WSA. Most streamflow results from infrequent but intense storms and snowmelt. The WSA is part of a closed basin with no outflow of surface water.

The Chain of Craters contains three vegetative types, according to the Bailey-Kuchler classification system, ponderosa pine, piñon-juniper woodland, and grama-galleta steppe. (Note: The BLM has selected this U.S. land classification system because it assists in planning at a national level and combines current knowledge about the ecosystem geography of the country. It also serves as an overview of ecosystem and landform representation in the National Wilderness Preservation System.)

Existing & Potential Uses

The primary uses occurring in the WSA are livestock grazing, recreational activities, and traditional cultural practices by American Indian tribes. The WSA is also valued for its scenery, which is influenced by local landform and vegetative features.

At least three American Indian tribes (Acoma, Zuni, and Navajo) have close ties to the Chain of Craters. The WSA is part of a cultural landscape used by these groups to define and continue their culture and traditions.

Little specific information on Pueblo use of this area is available. Knowledge of many important places may be held by only a handful of people in a pueblo or tribe. Therefore, many specific places and practices pertaining to the Chain of Craters are unknown to the BLM, and continued consultation and coordination with the concerned American Indian groups is imperative.

The Ramah Navajos have expressed strong concerns about the Chain of Craters. Many Navajo shrines are believed to be present in the area. These places used for prayer may be important to the entire Navajo people or used only by an individual family. The Chain of Craters also includes specific areas where plants, birds, minerals and other natural substances are gathered for use in ceremonies, and more generalized areas where Navajos hunt, gather dye materials and pick nuts. The accessibility of these resources and places for prayer and other traditional uses is a concern to the Ramah Navajos, as it is to the Pueblos.

Recognizing that these groups have used the NCA in the past, the Congress through P.L. 100-225 guarantees them access for traditional cultural and religious purposes (consistent with the American Indian Religious Freedom Act and the Wilderness Act). P.L. 100-225 further provides that specific portions of the NCA can be temporarily closed to protect privacy for traditional activities.

Surveys conducted during the summer of 1989 indicate that prehistoric cultural remains are very sparse in the Chain of Craters WSA. However, homesteads and logging sites exist from the 1930s and 1940s; the BLM has fenced the Worley Homestead to protect it.

No mineral resources have been developed within the Chain of Craters WSA, and no mining claims or federal leases exist. With passage of P.L. 100-225, all federal minerals in the NCA were withdrawn from entry and development.

Portions of two BLM grazing allotments (Cerro Brillante, #207, and Los Cerros, #210) lie within the boundaries of the WSA (refer to Map 35). Each of these allotments contains range improvements (refer to Map 36). The current grazing use levels for these allotments are displayed in Table 3-7. The season of use for Cerro Brillante is yearlong and for Los Cerros it is 6 months.

Range improvements within both allotments include approximately 21.5 miles of wire fenceline, 17 dirt tanks, 16 troughs, 9 miles of buried water pipeline, two wellheads, and three 10,000-gallon, aboveground storage tanks. A water well was drilled on public land in 1981 (T. 7 N., R. 13 W., NW¼ Section 34) within ¼ mile of CR 42 on the east side of the WSA. During 1994 and 1995, all the buried pipeline was replaced so livestock would have a reliable water distribution system.

Records of logging in the Chain of Craters date from 1948 through 1975 (with the majority of cutting occurring before 1959), during which 22 contracts were awarded for the harvest of 6,353 million board feet of timber. However, designation of the WSA as part of the NCA in 1987 retired commercial timber production as a potential use. P.L. 100-225 prohibits timber harvest and the collection of green or deadwood products for sale or other commercial purposes.

Under the most current recreation (ROS) inventory, the BLM has classified the Chain of Craters WSA as roaded natural, semi-primitive motorized, and semi-primitive non-motorized (refer to Map 6 and Table 3-2). The portion of the study area that borders CR 42 is considered roaded natural because the road is maintained by the county. (Note: The condition of CR 42 limits accessibility during wet weather.)

The amount of recreation use in the Chain of Craters has not been quantified. Hunting is known to take place; in recent years BLM employees have encountered deer hunters during patrols. The WSA offers opportunities for recreational uses including sightseeing, day hiking, mountain biking along old vehicle routes, backpacking, camping, semi-primitive motorized touring, and horseback riding. Opportunities also exist for birdwatching, landscape and nature photography, and observation of geologic features.

In the Rio Puerco RMP (USDI, BLM 1986), the BLM limited motorized vehicle use in the Chain of Craters to existing vehicle ways. Approximately 46.5 miles of inventoried vehicle travel routes exist within the WSA (refer to Map 18). A selected route for the CDNST also passes through the Chain of Craters.

Two wildlife exclosures are located within the Chain of Craters, both in T. 7 N., R. 13 W. One exclosure in Section 17 is located in ponderosa parkland between two cinder cones. This exclosure contains an inverted umbrella (a water collection device for wildlife). The other exclosure is located in Section 19 in a rabbitbrush flat. Water is available from a dirt tank located just south of this exclosure.

Wilderness Criteria

The quality of mandatory wilderness characteristics of the Chain of Craters WSA (size, naturalness, and opportunities for solitude or primitive and unconfined recreation) is documented in the *Wilderness Analysis and Suitability Report* (refer to Appendix I). The area meets the size requirement of the Wilderness Act (having at least 5,000 acres). The WSA contains livestock grazing use and improvements, an extensive vehicle route network, and past logging activities. This human work, which is widespread throughout the WSA, noticeably decreases its naturalness.

Manageability

Land ownership along the margins of the WSA (Ramah Navajo on the western border, and other private owners on the northern and eastern borders)

TABLE 3-7

GRAZING ALLOTMENTS
OVERLAPPING THE CHAIN OF CRATERS WSA

Allotment Name	No.	Total Acres (public land)	Acres in WSA (public land)	% Acres Within WSA	Total AUMs	AUMs in WSA	% AUMs Within WSA
Cerro Brillante	207	21,800	2,600	12	3,087	370	12
Los Cerros	210	40,100	15,700	39	5,424	2,115	39
Totals		61,900	18,300	30	8,511	2,485	29

may present management problems. The potential for trespass onto private or tribal land by wilderness users exists, although trespass could occur regardless of wilderness designation. The proximity of the subdivided quarter-section to the north of the WSA could intrude on the area's visual qualities if development took place.

Because of historical ties, uses of the area by local Pueblo and Navajo Indians, and the nature of Navajo traditional cultural practices, the BLM cannot effectively administer the Chain of Craters as wilderness without serious conflicts. Prohibition of access by motorized vehicle would cause significant hardships in carrying out traditional cultural practices, which are not confined to specific localities, times of year, or designated individuals. P.L. 100-225 allows for nonexclusive access by American Indian people for traditional and religious purposes as long as it is consistent with the intent of the Wilderness Act. However, the act also generally prohibits the use of motor vehicles and motorized equipment. Under these circumstances, it would be extremely difficult to establish an administrative procedure to allow vehicular access into wilderness or define when vehicle use is appropriate for cultural and religious purposes without being in violation of the Wilderness Act. Special provisions for this area in wilderness legislation would be required.

Lands Contiguous to the Cebolla Wilderness

These lands are located contiguous to the boundaries of the southern portion of the Cebolla Wilderness (refer to Map 25). Since the designation of this wilderness in 1987, the BLM has acquired approximately 8,200 acres of contiguous private land. The agency is now inventorying this public land with other parcels (2,180 acres, for a total of 10,380 acres) and studying it for wilderness suitability. (Without the acquired land, the isolated public land parcels were not contiguous to an existing wilderness nor of sufficient size to meet the wilderness criteria.)

Existing Resources & Environment

These contiguous lands are an extension of the characteristic landscape of the Cebolla Wilderness, including mesas, canyons, ridges and broad valleys covered with conifer forests, piñon-juniper woodlands, and grasslands. The contiguous lands in the North Pasture area at the mouth of Cebolla Canyon and along the western edge of the wilderness are characterized as open terrain with gentle grassland slopes. Those lands in the Sand Canyon drainage, and on the north end of the mesas at the mouth of Sand Canyon, are broken terrain (steep slopes with rock outcrops) with conifers, grasses and shrubs. The mesas and ridges rising above the grassy valleys and alluvial fans offer a variety of scenic vistas.

The mixed character of the area provides varied habitats for wildlife. Birds of prey include golden eagles, red-tailed hawks, prairie falcons and great horned owls, with peregrine falcons migrating through. Large mammals include mule deer, bears, coyotes, bobcats, foxes, and mountain lions. The broad valleys support reptiles and many small mammals such as prairie dogs and badgers. No threatened or endangered animal or plant species are known to

exist on the contiguous lands. If any of these species were located here, the BLM would protect them by complying with appropriate laws and regulations.

This area contains nationally significant archaeological sites in extremely high densities. The Dittert Site, which lies just inside the western boundary of the Cebolla Wilderness and is listed on the National Register of Historical Places, is a prehistoric community with a Chacoan building, great kiva and two prehistoric roads. Vehicle access to the wilderness boundary near this site is through the contiguous lands.

Geologically the contiguous lands are located between the structural high of the ancestral Zuni Highlands on the west and the structural low of the Acoma Sag to the east. A few northwest-trending faults exist. Sedimentary rocks of the Cretaceous Age crop out within the area and dip at low angles to the east. These rocks represent the uppermost units of a sedimentary section that ranges from Pennsylvanian to Cretaceous in age.

Deposition in the area began when the Pennsylvanian marine environment encroached upon the granitic/metamorphic Zuni Highlands. The highlands served as a sediment source, so the Pennsylvanian rocks include sandstones, shales, and marine carbonates. Permian Age rocks consist of both continental and marine deposits. Continental environments (floodplains, rivers, lakes and dune fields) existed through most of the Triassic and Jurassic periods. Transitional marine environments alternated with the open marine deposition through Cretaceous time, resulting in the intertongued Dakota Sandstone and Mancos Shale. With the Crevasse Canyon Formation, this sandstone and shale form the cliffs and valleys of the contiguous lands.

The Pennsylvanian section, which underlies the contiguous lands, has petroleum potential because both source rocks and reservoir rocks were deposited during Pennsylvanian time (Broadhead 1986). The contiguous lands lie within an area that has been classified as having moderate potential for oil and gas development (McLemore *et al*. 1986), but has no proven reservoirs. The possibility of both stratigraphic and structural hydrocarbon traps exists.

The Upper Cretaceous Crevasse Canyon Formation crops out over much of the contiguous lands and contains carbonaceous shales and thin coal beds. Coal potential is considered low because the beds are thin (Bigsby and Maxwell 1981). The area also has a low resource potential for undiscovered metals, oil and gas, and geothermal energy.

Geologic conditions that could produce carbon dioxide gas exist in the area, but no exploration has occurred. The gas may form when the igneous rocks intrude into carbonate rocks, causing gas to be released by heating. If stratigraphic or structural traps exist, the gas may exist in quantity, although its economic value depends on nearby developed oil fields or a pipeline for shipment.

Existing & Potential Uses

The contiguous lands are being used primarily for grazing, recreation and wildlife habitat. Scattered evidence exists of human imprints on the contiguous lands from existing and past uses (refer to Appendix J for inventory findings). The 62,000-acre Cebolla Wilderness is considered predominantly natural, with opportunities both for solitude and primitive and unconfined recreation, so its presence would add to the wilderness suitability of the contiguous lands.

The diverse broken terrain, variety of wildlife habitat, dramatic vistas, and prehistoric and historical resources extending from the Cebolla Wilderness into the contiguous study lands support non-motorized and dispersed types of recreation. The area offers opportunities for uses such as hiking, primitive camping, backpacking, hunting and photography, all of which are ongoing (based on BLM staff observation and personal contact made with visitors during areal patrols). The amount of recreation use occurring on the contiguous lands and within the adjacent wilderness is unknown. However, because people are becoming more aware of the area and its closeness to Albuquerque, recreational use of the area is expected to increase.

The contiguous lands are within one grazing allotment (El Malpais, #203) whose season of use is yearlong. This grazing allotment has 51,200 acres of public land in the Cebolla Wilderness and 28,700

public acres in the West Malpais Wilderness or 59 percent of its total acreage within wilderness boundaries. Range facilities on the contiguous lands consist of fencelines, windmills, dirt tanks and troughs (refer to Appendix J).

No mineral resources have been developed within the contiguous lands. If oil and gas exploration and development were to take place, any carbon dioxide present would become more valuable because of its use in the secondary recovery of oil. No mining claims or potential for locatables exists. The BLM is attempting to acquire the subsurface mineral estate in this area in accordance with the Land Protection Plan (USDI, BLM 1989b). If acquired, this estate would be withdrawn from mineral leasing and development in accordance with P.L. 100-225.

The Cebolla Canyon Road (designated as BLM Road 2003), which separates the northern portion of the Cebolla Wilderness from the southern portion, is used by ranchers, recreationists and the BLM. This graded road is receiving periodic maintenance, but is subject to erosion because it parallels the drainage in Cebolla Canyon. Consideration has been given to rebuilding part of the road to prevent additional resource damage from erosion and vehicle use.

Wilderness Criteria

The most noticeable imprint of humans on the contiguous lands comes from graded roads and routes that have developed through continued use, including 31 miles used to access livestock grazing facilities, and from the grazing facilities themselves. A majority of these facilities are located within Cebolla Canyon on terrain of low rolling hills with a vegetative cover of shrubs and grasses. Other facilities are located between CR 41 and the western wilderness boundary on the formerly private lands. Many fences are extensions of allotment and pasture fences already existing in the wilderness, and some routes serve as wilderness boundaries. Overall, these human imprints are scattered throughout the contiguous lands, and some are screened by landforms and vegetation, so they do not significantly detract from the area's naturalness.

In the western and northern portions of these lands, the open terrain and low-growing vegetation provide very little visual screening and few opportunities to find isolated locations for solitude. However, elsewhere screening and isolation can be found in broken terrain (steep canyons and mesas) with conifers, grasses and shrubs. Such areas include the Sand Canyon drainage, the north end of the mesa at the mouth of Sand Canyon on the west side, the southern end of the contiguous lands, and the land along Cebolla Canyon.

As on the adjoining Cebolla Wilderness, many special features are present. They include scenic and cultural values, elements of scientific and educational value, and a diversity of wildlife.

The contiguous lands have opportunities for a diversity of primitive and unconfined recreation. When combined with the existing Cebolla Wilderness, the contiguous lands would provide a larger area in which visitors could pursue such activities.

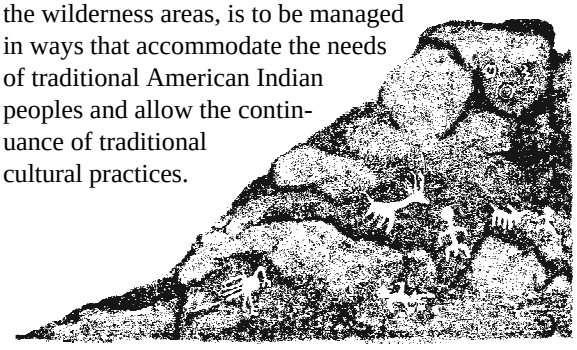
Manageability

Some of the contiguous lands reviewed in this plan are not considered manageable for wilderness because they are subject to outside sights and sounds from traffic and uses of county and state roads. Some lands do not possess scenic, scientific, and recreational values that supplement or complement those of the Cebolla Wilderness.

AMERICAN INDIAN USES & TRADITIONAL CULTURAL PRACTICES

Introduction

A diversity of deeply rooted cultural traditions is one of the special characteristics New Mexico offers to both local citizens and visitors. In P.L. 100-225, the Congress made it clear that the NCA, including the wilderness areas, is to be managed in ways that accommodate the needs of traditional American Indian peoples and allow the continuance of traditional cultural practices.



Navajo Uses of the Planning Area

The Ramah Navajo Indians have expressed strong interest in the Planning Area. Past Navajo uses of the area include plant gathering, hunting and probable livestock herding. Numerous sweatlodges of presumed Navajo origin occur throughout the Planning Area. Portions of the lava that have mythological importance are also found. For example, the recent lava flow known as the "black rock area" is important because it is mentioned in the Navajo curing ceremony, Monsterway. These lava flows are the hardened blood of Yeitso, the chief of the enemy Yei, who was killed by the Hero Twins near Mount Taylor. In addition to places of mythological importance, it is likely that prayer locations and other places of religious importance to the Navajos occur here as well.

Pueblo Indian Uses of the Planning Area

The Planning Area is believed to contain numerous places important in the Acoma and Laguna religions, including lava flows, shrines, high points, water sources, caves, and pilgrimage routes. Both Acoma and Laguna people maintain shrines in the Planning Area. The majority of tribal members may not visit or even know of these places, but they are important to the entire pueblo.

The numerous Anasazi habitation sites within the Planning Area are recognized by Acoma people as ancestral villages. Burials associated with these sites are regarded as the remains of ancestors. It is important to Acoma people that these sites remain undisturbed by human activity. The Acomas collect plant materials such as herbs, Douglas fir boughs, piñon nuts, and Rocky Mountain beeweed in the Planning Area. Acoma potters also collect sherds from prehistoric pots to be crushed and added to pottery clay as tempering material, a practice dating back at least a thousand years.

In accordance with the wishes of these groups, the BLM does not actively manage any sites or areas for traditional American Indian uses. Instead, the agency seeks to keep these groups informed about major activities proposed within the Planning Area, giving them time to respond if traditional uses are likely to be affected.

CULTURAL RESOURCES

Introduction

The Planning Area includes a wealth of archeological and historical remains. Not only are these sites important from a scientific point of view, but some are well preserved and could be of considerable interest to the general public. Prehistoric remains in the Planning Area are also very important to American Indians who recognize them as ancestral places.

Inventory

Archeological remains have been reported in the Planning Area since the middle and late 1800s, but intensive study of this area did not begin until the late 1940s and early 1950s. During this time, Reynold Ruppe and Alfred Dittert directed reconnaissance and excavation along the western flanks of Cebollita Mesa. Most of what is known about the prehistory of this area comes directly from these studies.

Additional archeological survey has been completed in conjunction with proposed land-disturbing projects, and in the course of BLM-sponsored inventories to obtain baseline information about the Planning Area's cultural resources. To date, intensive (Class III) cultural resources inventory information is available for about 2 percent of the Planning Area and adjacent units (5,636 acres). The inventories are summarized in Table 3-8.

PaleoIndian Period

The earliest human use of the Planning Area's region may have been as long as 12,000 years ago, near the end of the last major Ice Age. This occupation, known as the PaleoIndian period, was based in part on the hunting of animals that are now extinct. Archeological sites of this age usually consist of low-density scatters of stone artifacts; the sites are recognized as PaleoIndian only if projectile points or certain other diagnostic stone tools are found. Although PaleoIndian sites have been recorded on lands east and west of the Planning Area, very little evidence of such occupation has been found in the area itself.

Archaic Period

By about 7,500 years ago, the Ice Age had ended and the climate was becoming warmer and dryer. With shifts in climate came new economic and social strategies that were based on gathering a wide range of plants and hunting a variety of game animals. This period is known as the Archaic Period, which is characterized by a well-organized and complex round of migrations based on seasonal availability of a broad spectrum of plant and animal resources. The Archaic Period lasted until about A.D. 400 and is divided into five successive phases distinguished on the basis of projectile points.

Sites of the Archaic Period usually consist of scattered stone chips and tools. Occasionally, careful excavation yields evidence of pithouses or brush structures. Artifacts from Archaic Period sites include projectile points, scrapers and grinding stones.

This period is not well represented in the Planning Area, where only 20 Archaic components have been recognized.

TABLE 3-8

CLASS III CULTURAL RESOURCE SURVEYS WITHIN & ADJACENT TO THE EL MALPAIS PLANNING AREA

Unit [a]	Acres Surveyed	% Surveyed
Cebolla Wilderness	2,192	3.5
West Malpais Wilderness	331	.8
Chain of Craters WSA	617	3.4
Brazo	608	2.1
Breaks	415	6.4
Cerritos de Jaspe	416	3.3
Cerro Brillante	321	.9
Continental Divide	214	.9
Neck	137	.5
Spur	109	1.9
Brazo Non-NCA	64	.01
Breaks Non-NCA	64	.01
Techado Mesa-SFO	66	.6
Tank Canyon-SFO	82	.7

Note: [a] No Class III surveys have been done in the Cerro Brillante-AFO and Continental Divide-AFO Units.

Pueblo Period

Late Archaic peoples had some knowledge of

agriculture, but relied only casually on crops for their livelihood. By about A.D. 700, settlements of people who relied heavily on agriculture were common. These groups raised corn, beans and squash, and supplemented their diets by hunting and gathering wild plants. They are known as the Pueblo or Anasazi, and their development can be traced through time to the present-day Pueblo Indians. Sites of the Pueblo Period include rock art, pithouses, remains of masonry and jacal (brush) buildings and simple artifact scatters.

The Pueblo Period can be divided into eight successive phases based upon changes in pottery styles and other characteristics. Earlier phases are characterized by ceramic (pottery sherd) and lithic (stone and flake) scatters and occasionally by pithouses. By about A.D. 850, small surface houses were predominant, sometimes grouped around a great kiva. Later, around A.D. 1050, these communities sometimes included a large building with certain Chacoan characteristics such as massive masonry, extremely large rooms, blocked-in kivas and prehistoric "roads."

After A.D. 1150, a shift occurred from small individual family residences to larger multifamily dwellings. This trend culminated in a handful of large pueblos with 100 to 400 rooms. By around A.D. 1400, most of the Planning Area had been abandoned as an area of primary residence. Undoubtedly it continued to be used by American Indian peoples for hunting, gathering, and other traditional purposes.

Two very striking patterns are apparent for the Pueblo Period. First, the overwhelming majority of sites date to the late Pueblo II and early Pueblo III periods (between A.D. 1050 and 1200). There can be little doubt that the major period of Anasazi occupation in the Planning Area occurred during these times.

The second striking pattern is the strong concentration of Anasazi sites along the NM 117 corridor. This is shown dramatically in Map 37, which shows estimated site densities.

The Anasazi sites are of concern to local American Indian groups, especially the Acomas. These sites are recognized as the past homes of Acoma ancestors and can be sources of spiritual power and rejuvenation. The Acomas also collect potsherds from these sites to be crushed and used as temper by contemporary Acoma potters.

Traditional American Indian attitudes toward excavation of the Anasazi ruins are diverse. The Acomas feel strong ties to these sites and prefer that they not be disturbed. Disturbance directly related to the ongoing history of the Acoma people is accepted with some reluctance, but excavations that result from other construction, pothunting, or scientific investigation are strongly opposed.

The Navajos view prehistoric ruins (and other abandoned habitations) as places of spiritual danger. They are concerned that disturbance of these places can cause misfortune, both to individuals and to whole peoples.

Historical Times

Anglo-European use of the Planning Area's region began with the entry of Francisco Vasquez de Coronado in 1540. However, it was not until the construction of the Atchison, Topeka and Santa Fe Railroad through the Malpais in 1881 that intensive Anglo-European use of the region began in earnest. Homesteading may have begun as early as 1916, but the development of the logging industry in the late 1920s really stimulated rural settlement in the Planning Area. Most historical sites in the Planning Area are sawmills, logging camps and homesteads dating between the 1930s and the 1960s.

Management Actions

Certain cultural resource properties are frequently referred to by name in this document. These particular places have been the focus of management attention or figure prominently in management actions proposed under one or more alternatives in this plan. These sites are described briefly in Table 3-9.

The BLM has an active program of cultural resource management in the Planning Area. Several

TABLE 3-9

MAJOR CULTURAL RESOURCE SITES IN THE PLANNING AREA

Site Name	Unit	Description
Aldridge Petroglyphs	Cebolla Wilderness	Extensive rock art panel
Armijo Canyon Homestead	"	Stabilized homestead-era residence
Armijo Canyon Springhouse	"	Stabilized homestead-era springhouse associated w/ Armijo Canyon Homestead
Cebolla Canyon Community--includes:	Breaks & Cebolla Wilderness	Major prehistoric Anasazi community w/principal occupation A.D. 800-1325. Over 50 buildings.
• Arroyo Ruin	Breaks	Buried 20-room Anasazi pueblo occupied A.D. 1125-1175. Focus of erosion control measures.
• The Citadel	Cebolla Wilderness	60-room Anasazi pueblo occupied A.D. 1250-1325
• Oak Tree Ruin	Breaks	Stabilized 40-room Anasazi pueblo occupied A.D. 1250-1325
Cebolla Canyon Schoolhouse	Cebolla Wilderness	Homestead-era schoolhouse & community center
Cerritos de Jaspe Community	Cerritos de Jaspe	Dispersed prehistoric Anasazi community primarily occupied A.D. 950-1125. Includes 30-45 individual pueblos, each having up to 20 rooms.
Dittert Site	Cebolla Wilderness	Stabilized Anasazi masonry pueblo built as Chacoan Outlier, occupied ca. A.D. 1150-1300. In Armijo Canyon Community.
Lobo Canyon Petroglyphs	"	Extensive rock art panel
Newton Site	Tank Canyon	165-room Anasazi pueblo occupied A.D. 1200-1325
Pinole Site	Cebolla Wilderness	100-room, fortified Anasazi pueblo occupied A.D. 1100-1325
Ranger Station Reservoir	Spur	Prehistoric Anasazi reservoir used A.D. 1200-1325
Rowe Homestead	Breaks	Homestead-era residential site
Stone House	Cebolla Wilderness	Homestead-era residential site
West Malpais Schoolhouse	West Malpais Wilderness	Homestead-era schoolhouse
Worley Homestead	Chain of Craters WSA	Homestead-era residential site

major inventory projects have been undertaken to document the location and baseline condition of archeological sites in critical or poorly known areas. These projects include Class III inventories in Cebolla Canyon and Armijo Canyon, and major Class II inventories in the Cerritos de Jaspe area and other parts of the Planning Area. Inventories have documented a number of the historical homesteads, and an ongoing volunteer project will record all the Planning Area's known rock art. Finally, the BLM and the NPS have interviewed a number of long-time residents, recording approximately 26 hours of oral histories.

Formal monitoring programs have been implemented for three prehistoric ruins: the Dittert Site, Arroyo Ruin, and Oak Tree Ruin. This activity consists of taking a series of standardized photographs each year so that any changes in site condition can be detected and corrective action taken. Since 1988, Park Rangers on the NCA staff have actively patrolled the area. In recent years the BLM has been involved in two investigations of violations of the Archeological Resources Protection Act, and has successfully prosecuted a case involving theft of building stone from a historical homestead.

Physical protection measures implemented in the Planning Area include erosion control, stabilization and fencing. The BLM has installed erosion control structures to retard erosion of the Arroyo Ruin in Cebolla Canyon, and stabilized two prehistoric, masonry structural ruins, the Oak Tree Ruin and the Dittert Site. The agency has also completed a stabilization assessment for eight historical homesteads in the Planning Area, and major historical stabilization projects at the Armijo Canyon Homestead and Springhouse. To prevent livestock damage and theft of materials, fences have been built around five historical homesteads.

The BLM has also begun to interpret cultural resources in the Planning Area. Many of the exhibits in the Ranger Station highlight cultural resources, and each year BLM employees lead half a dozen or so guided hikes to archeological and historical sites. Cultural resources are also incorporated into an ongoing environmental education program in the Grants public schools.

WILDLIFE HABITAT

Introduction

The Planning Area provides a wide variety of habitats that support diverse populations of wildlife, including over 30 species of mammals, more than 60 species of birds for at least part of the year, and many species of reptiles, amphibians and invertebrates. The diversity of slope and terrain, vegetation, and sandstone and lava formations provides these important wildlife habitats. A list of vertebrate species likely to occur within the region of the Planning Area is found in Appendix F.

Water availability for wildlife is limited throughout the Planning Area, making all waters of special concern. Several wildlife waters and exclosures have been completed in various areas to benefit wildlife, as shown in Table 3-10. Waters developed primarily for livestock also provide an important water supply for wildlife, especially in the wilderness units. Dirt tanks scattered throughout the Planning Area provide water on an intermittent basis.

Habitats in the Planning Area are dispersed over the landscape in a patchwork pattern that provides large areas of "edge," where one habitat blends into another. The large number and size of these edge areas adds to habitat complexity and increases wildlife species diversity.

Species Management

The BLM supports state management plans for those game species that state law defines to be of economic or public value. Species emphasized in the Planning Area because of interest by the NMDG&F include pronghorn antelope, mule deer, elk, turkey, Abert's squirrel, quail, mourning dove and waterfowl. Management objectives for these species are found in the *Operations Plan for Terrestrial Wildlife* (NMDG&F 1987). Other vertebrate species of high federal, state, or public interest include the special-status species (refer to the "Threatened and Endangered Species" section below), prairie dogs, raptors, neotropical migratory birds, black bears, cougars and coyotes. The wildlife program for the Planning Area focuses on these key species and their habitats.

Hunting and trapping continue within the Planning Area, where the NMDG&F manages the hunting seasons for elk, mule deer, pronghorn antelope, black bear, mountain lion, turkey, mourning dove, waterfowl and Abert's squirrel. Mule deer can be found throughout, generally associated with the piñon-juniper woodlands and forest habitats. Rocky Mountain elk reside mainly in the ponderosa pine forest habitats located in the Cebolla Wilderness, Chain of Craters WSA, Continental Divide and Brazo Units.

TABLE 3-10

PROJECTS COMPLETED UNDER THE EL MALPAIS WILDLIFE HABITAT MANAGEMENT PLAN

Project Name	Unit	Location	Year Completed	Purpose
York Wildlife Seeding Exclosures	Brazo	T. 4, 5 & 6 N., R. 10, 11 W.	1967	Protect seedings for wildlife use
Bighole Inverted Umbrella #3	West Malpais Wilderness	T. 7 N., R. 11 W. Sec. 8, SE¼SE¼	1982	"
York Inverted Umbrella & Exclosure	Cerro Brillante	T. 6 N., R. 12 W. Sec. 30, SW¼NW¼	1982	"
La Rendija Inverted Umbrella	Continental Divide	T. 8 N., R. 12 W. Sec. 5, NE¼SW¼	1982	"
Malpais Swale Exclosure	West Malpais Wilderness	T. 7 N., R. 12 W. Sec. 29, NW¼NW¼	1982	Reduce livestock use of spring forbs to improve antelope habitat
Laguna Brillante Exclosure	Cerro Brillante	T. 6 N., R 13 W. Sec. 3, NE¼SE¼	1982	"
Laguna Americana Exclosure	Continental Divide	T. 8 N., R. 13 W. Sec. 13, NW¼NE¼	1982	Protect riparian habitat by excluding livestock
Cerro Chato Exclosure & Wildlife Water	Chain of Craters WSA	T. 7 N., R. 13 W. Sec. 17, SW¼NE¼ Sec. 19, SW¼SE¼	1982-83	Improve mule deer habitat & protect water from livestock use
Cerro Americano Parabolic Guzzler & Exclosure	Continental Divide	T. 8 N., R. 13 W. Sec. 11, NW¼SE¼	1984-85	Improve mule deer habitat
Cebolla Spring Exclosure	Brazo	T. 5 N., R. 10 W. Sec. 12, NW¼NW¼	1995	Protect riparian habitat & spring source from livestock use

Pronghorns occur predominantly in the shrub-grasslands of the Cerro Brillante Unit. Access into the wilderness areas for hunting or trapping is limited to foot or horseback.

The most common predator found in the Planning Area is the coyote, which is considered to be abundant throughout. Other predators include bobcats, grey foxes, and a limited number of mountain lions.

Birds of prey (raptors) vary in abundance depending on the availability of a prey base. The numerous bluffs within the Spur Unit and Cebolla Wilderness provide nesting habitat for the golden eagle, red-tailed hawk, kestrel, great-horned owl, prairie falcon and an occasional peregrine falcon. Upland gamebirds include the mourning dove (widespread throughout the Planning Area), quail (occurring in the shrub-grassland community) and Merriam's turkey (mainly found in the ponderosa pine forest habitat).

The only habitats considered to be wetlands within the Planning Area are playa lakes, which are ephemeral (temporary) and dependent on annual precipitation, and small marshy areas associated with natural springs. Waterfowl (e.g., mallards, pintails) and shorebirds (e.g., killdeer, spotted sandpiper) use natural springs, stock tanks and ephemeral water sources for resting and feeding during migration. Along the northern portion of NM 53 adjacent to the Neck Unit, a pond fed by Ojo del Gallo (a spring) attracts waterfowl and shorebirds to the area. Although the majority of the land covered by the pond is private, it provides unique wildlife habitat not found over most of the Planning Area. Limited nesting occurs in areas where sufficient water and cover exist.

Vegetative/Habitat Communities

Each animal species requires three elements for its existence--food, water and cover. Food and water are required to sustain the basic functions of growth, maintenance, and reproduction. Cover is vegetation, space, or landforms used by wildlife for protection from predators or the extremes of weather.

A habitat is a place where an animal finds the required arrangement of food, water and cover to meet its biological needs. Different species of animals require different combinations of these three elements. Certain habitats are especially important to wildlife because they are in limited supply, provide essential combinations of habitat factors during critical portions of a life cycle, or allow protected access to preferred habitats during seasonal migrations. Within the Planning Area, lack of certain habitat attributes may limit wildlife species occurrence in what otherwise appears to be suitable habitat.

Regardless of where it is located in the Planning Area, a particular vegetative community can support similar wildlife species diversity, and responds to management actions in a similar manner. Therefore, vegetative communities are reviewed when deciding where and how wildlife habitat enhancement, maintenance and protection measures should be implemented. Using satellite-gathered data, the BLM has classified the NCA's vegetation into three broad communities (Grass-Shrub, Piñon-Juniper and Ponderosa Pine).

Grass-Shrub Community

This vegetation is found in large blocks of the Neck, Cerro Brillante, and southern portion of the West Malpais Wilderness. It is also found in smaller scattered parcels throughout the Cebolla Wilderness, Breaks and Spur Units, where it blends with piñon-juniper. In the rolling hills of the Cerro Brillante Unit are found pronghorn antelope, jackrabbits, cottontails, and a variety of birds, including quail. An occasional glimpse of pronghorn antelope is available along CR 42.

The uneven topography of the old lava flows within this grass-shrub vegetation creates numerous playa lakes during the rainy season, which offer an ephemeral water supply that supplements developed waters. These lakes provide breeding grounds for invertebrates and amphibians, and make attractive resting areas for a wide variety of birds, including migratory waterfowl. Soils in parts of these areas are deep enough to support small burrowing mammals such as prairie dogs, which are a food supply for raptors. Such holes also provide habitat for burrowing owls.

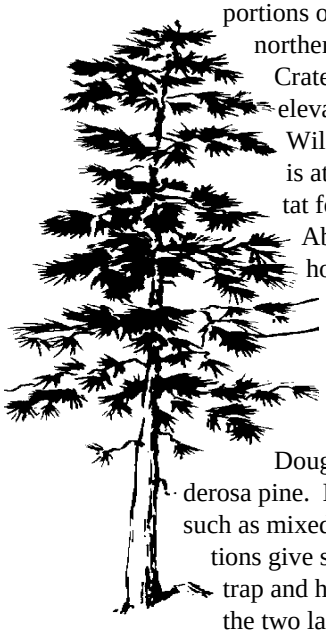
Piñon-Juniper Community

This vegetation covers large portions of the Continental Divide, Chain of Craters, Cerro Brillante, Cerritos de Jaspe, Spur, Cebolla Wilderness and Brazo Units. Large, uniform stands of piñon-juniper characterize these areas, as well as smaller clumps of the trees scattered through grassy meadows. This mixture of habitats is attractive to mule deer, turkey and many species of birds, and provides cover for wildlife during severe weather.

Along the western edge of these areas in the Spur Unit and the Cebolla Wilderness, large sandstone buttes rise above the grassy valleys and lava flows. The cliffs provide nesting sites for golden eagles, prairie falcons and peregrine falcons, and on occasion, cougars, elk, and bears have been spotted. The area is especially rich in winter resident and migrating birds, and its piñon pine trees often produce heavy crops of nuts valued by visitors as well as wildlife.

Ponderosa Pine Community

This vegetation occurs throughout the Planning Area on sites where the appropriate conditions exist. These sites are dominated by ponderosa pine with understories of shrubs (e.g., currant, oak, mountain mahogany, raspberries), grasses, forbs, quaking aspen and rock outcrops. The vegetation covers large portions of Hole-in-the-Wall, the northern portion of the Chain of Craters WSA, and the higher elevations within the Cebolla Wilderness and Brazo Unit. It is attractive and important habitat for mule deer, turkeys, Abert's squirrels, tree- and hole-nesting wildlife, coyotes, and many species of birds. Elk also are seen occasionally.



In some areas scattered Douglas fir occurs with the ponderosa pine. Landform characteristics such as mixed lava and sandstone formations give some areas the ability to trap and hold water, which allows for the two large trees to occur at elevations much lower than they usually are found. Small areas of classic ponderosa parkland exist at higher elevations in the Planning Area, characterized by widely spaced, large adult (300+ year-old) trees in grassy meadows with few shrubs.

Special-Feature Habitats

In addition to the three broad vegetative communities, numerous unique, special-feature habitats exist within the Planning Area (e.g., volcanic plains, cinder cones, caves, riparian wetlands). Except for the lava flows, these special habitats are generally confined to small areas scattered throughout the three larger communities.

The cinder cones and volcanic plains of the Continental Divide Unit, Chain of Craters WSA and West Malpais Wilderness create a complicated pattern of vegetation and terrain. This combination provides habitat for mule deer, coyotes, bears, many species of reptiles, and game birds such as turkeys and doves. Caves and riparian-wetland habitats offer small but very important microhabitats for numerous wildlife species including bats, waterfowl, shore birds, reptiles, amphibians and migratory songbirds.

THREATENED, ENDANGERED & OTHER SPECIAL-STATUS SPECIES

Introduction

Seven federally listed threatened or endangered, 1 proposed endangered, 2 federal candidate, and 18 species of concern (BLM sensitive) are known or potentially could occur on public lands within the Planning Area (USDI, FWS 1995). In addition, 12 species listed by the State of New Mexico as threatened or endangered also are known or potentially could occur. Appendices F (wildlife) and G (plants) provide lists of these species.

Informal consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act is in progress.

Species Management

Listed and federal candidate species that are known to occur within the Planning Area include the

bald eagle, peregrine falcon and mountain plover. The Planning Area is outside the bald eagle's normal range (along the Rio Grande corridor), but the birds have been observed migrating through the area. The American peregrine falcon is known to nest within the Planning Area. In 1994, a pair of adults were observed at a nest site on several occasions, but the available information indicates the nesting attempt failed. In 1995 and 1996, additional sightings of adult birds were made by NMDG&F employees near the 1994 nest site, but no nesting attempts were confirmed. The mountain plover was identified in a 1995 survey by the NMDG&F as using the southern portion of the Planning Area (Williams 1995).

Listed and federal candidate species that potentially occur within the Planning Area but have not been specifically identified include the black-footed ferret, Arctic peregrine falcon, Southwestern willow flycatcher, Mexican spotted owl, Zuni fleabane and puzzle sunflower. The black-footed ferret is considered to be extirpated from New Mexico (NMDG&F 1996), so it is not likely to be found within the Planning Area. The Arctic subspecies of the peregrine falcon would migrate through the area only during the spring and fall. Because suitable riparian and old-growth forest habitats are lacking, neither the Southwestern willow flycatcher nor the Mexican spotted owl are likely to be found within the Planning Area. Both the Zuni fleabane and the puzzle sunflower have been identified as occupying habitats only outside the Planning Area.

Species of concern that are known to occur within the Planning Area include the Western burrowing owl, loggerhead shrike, ferruginous hawk, cinder cone scorpionweed (*phacelia*), Acoma fleabane and grama grass cactus. All these species occur throughout the Planning Area wherever their particular habitat sites are found (e.g., prairie dog towns, open piñon-juniper savanna, cinder cones). No specific surveys have been conducted for these species, but they all have been randomly observed.

Vegetative/Habitat Communities

The following discussion is only an example of the general vegetative/habitat communities of the Planning Area, and the potential listed, candidate and BLM sensitive species (species of concern) that could occupy them. Many of the more mobile species (i.e., birds and bats) can use several different communities throughout the year.

Grass-Shrub Community

The threatened or endangered species in the grass-shrub community include the bald eagle, American peregrine falcon, and Arctic peregrine falcon. Other candidates and species of concern include the mountain plover, Western burrowing owl, ferruginous hawk, loggerhead shrike, Cebolleta southern pocket gopher, Texas horned lizard and grama grass cactus.

Piñon-Juniper Community

None of the threatened, endangered or other special-status species appear to be limited to or especially dependent upon the piñon-juniper vegetative community. However, Acoma fleabane is commonly found within this habitat, and many species of bats are known to use woodlands edges in association with special-feature (e.g., riparian) habitats for feeding.

Ponderosa Pine Community

This community is limited within the Planning Area. However, some listed species and species of concern that have the potential to occur in this habitat include the Northern goshawk and Mexican spotted owl.

Special-Feature Habitats

Several species are able to survive only in areas with specific habitat features (e.g., caves, cinder cones, riparian-wetlands) and are not found except where the features exist. These species include bats (occult little brown, spotted, big free-tailed, Yuma Myotis, fringed Myotis, long-legged, long-eared, and small-footed) and cinder cone scorpionweed (*phacelia)*.

Riparian-wetland habitats are limited in numbers and size within the Planning Area, but are scattered throughout all of the vegetative communities. The species that use this habitat include the bald eagle, Southwestern willow flycatcher, American peregrine falcon, Arctic peregrine falcon and puzzle sunflower.

VEGETATION

As described in Chapter 2, the BLM's goal for the Planning Area is to manage the existing vegetation to allow the Potential Natural Communities (PNCs) to be maintained or reestablished. According to data for Cibola County published by the Natural Resources Conservation Service, the environment in the Planning Area is capable of supporting four different PNCs, Grass-Shrub, Piñon-Juniper, Ponderosa Pine, and Lava Complex (NRCS; formerly the Soil Conservation Service, SCS, 1993). These PNCs were determined based on soils, other physical features and climate. They are the ideal vegetative communities that would become established if natural processes were allowed to be completed (refer to Appendix K for further detail). (Note: Three of the communities contain a mixture of vegetation, but are named for the predominant plant species. In contrast, the Lava Complex consists primarily of various types of rock and is named accordingly; it supports some vegetation where the flows are older and soils have formed.)

Each community usually occurs on a distinct area of the landscape. The range or limit of occurrence for each community will vary depending on soils, climate, topography, aspect, slope, elevation and use of an area. Within each community, vegetation from other communities will naturally occur in some varying but relatively small amounts. Communities compete with each other for space, sunlight, moisture and nutrients, and are therefore changing over time. Climate changes and human uses alter the mix of species, as well as their size and location. Human use has significantly contributed to shifts in the vegetative communities found in the Planning Area.

To allow comparison with the PNCs, the BLM has determined what vegetative classes now exist in the Planning Area. The agency acquired satellite remote sensing data gathered in 1994. Using Geographic Information Systems (GIS) computer capabilities, data on the area's existing soils, vegetation, landform and drainage patterns were compared and grouped to map distinct and unique areas referred to as Biophysical Land Units (BLUs). Four vegetative classes, Grass-Shrub, Piñon-Juniper, Ponderosa Pine, and Lava Complex were derived from the BLU data (refer to Appendix N for more information).

The BLM also used GIS to compare the NRCS potential communities with the existing BLU vegetative classes. The results of the comparison are shown in Table 3-11. The table displays the number of acres of existing vegetative classes found within the PNCs. From these comparisons, areas of concern or interest can be identified for further evaluation. For example, the area determined to have a Grass-Shrub PNC contains a higher acreage of piñon-juniper than expected, and the area with a Ponderosa Pine PNC is instead dominated by piñon-juniper. These differences are believed to be the result of past tree harvesting, grazing practices and fire suppression, added to periodic droughts.

These GIS comparisons provide a picture of the current mix of vegetation within each PNC. Consistent with PNC community goals, specific objectives for various vegetative species are discussed in the vegetation section of Chapter 2.

Rangeland Resources

Sixteen livestock grazing allotments overlap the Planning Area (refer to Map 4). The BLM has placed each allotment into a "Selective Management Category," based on its existing vegetative (ecological) condition and/or conflicts with other resource uses (e.g., wildlife, watershed). Categorization provides a system for focusing attention on the allotments in which changes in grazing management may be needed. The criteria for grazing allotment categorization are displayed in Table 3-12, with the specific category for each allotment found in Table 3-13.

The "I" category allotments are managed to improve their ecological condition and resolve resource conflicts. These are the allotments on which the BLM can apply vegetative management techniques, where the NRCS data indicate the potential is good for change. The "M" category allotments are managed to maintain current satisfactory resource conditions. The "C" category allotments typically contain small amounts of unconsolidated public lands, have no resource conflicts, and/or have a low potential for improved resource condition. These allotments are managed custodially (i.e., with grazing fees collected, but without large investments of time or money).

TABLE 3-11

POTENTIAL NATURAL COMMUNITIES COMPARED WITH EXISTING VEGETATION IN THE EL MALPAIS NCA (rounded to nearest hundred acres)

Potential Natural Communities [a]	Totals	Existing Vegetative Classes [b]			
		Grass-Shrub	Piñon-Juniper	Ponderosa Pine	Lava Complex
Grass-Shrub	101,300	81,900	18,400	900	100
Piñon-Juniper	97,000	15,500	61,700	16,000	3,800
Ponderosa Pine	49,800	8,200	27,200	13,400	1,000
Lava Complex	14,000	500	1,200	3,900	8,400
Totals	262,100	106,100	108,500	34,200	13,300

Notes: [a] Based on data from the Natural Resources Conservation Service (USDA, SCS 1993).
[b] Based on BLM satellite remote sensing data (1994) and Geographic Information Systems analysis.

Monitoring studies are done on all allotments, with the intensity and frequency based on allotment category. "C" allotments are field checked upon permit/lease renewal. For the "M" allotments, vegetative trend data is collected and reviewed before permit renewal. Trend and forage utilization studies are done and evaluated every 5 years on the "I" allotments. If evaluations indicate, changes in livestock grazing management are implemented. Categories are changed based on new resource information.

In the Planning Area, monitoring studies have been done on the "I" category allotments, followed by a review of grazing preference. These studies and reviews are part of the agency's ongoing rangeland management effort. For example, in 1992 the BLM issued decisions to establish new grazing preferences, which included sufficient forage to provide for wildlife needs. Table L-1 in Appendix L displays the grazing preferences before and after the monitoring studies and new decisions. In addition to these adjustments, other changes in grazing management have been implemented (refer to Table L-2).

On-the-ground monitoring studies will continue to be done. To enhance these monitoring methods and increase the success of vegetative management practices, the BLM will also continue to use satellite data and GIS computer capabilities. Based on the comparison and evaluation of these two types of data, the agency will continue to make adjustments in grazing use (including reduced livestock numbers). Vegetative treatments will be applied in specific areas where they are likely to succeed to encourage the formation of PNCs. As resource conditions change, the selective management categories can also be changed.

Areas Unusable for Livestock Grazing

Because of their slope and rockiness, many acres in the Planning Area are not usable by cattle for grazing. As a result of vegetative inventory, these acres have remained unallocated for grazing. Table 3-14 displays the unusable acres and AUMs.

Livestock Grazing in Planning Area Wilderness

P.L. 100-225 provides that livestock grazing may continue in the NCA, including in the West Malpais and Cebolla Wildernesses. The Department

TABLE 3-12

ALLOTMENT CATEGORIZATION CRITERIA

Category M (Maintain)	Category I (Improve) [a]	Category C (Custodial)
An allotment must meet conditions 1, 2 & 3 or 1, 2, & 4 (listed below).	An allotment must meet any one of the following three conditions.	An allotment must meet all of the following conditions.
1. Has no significant resource conflicts, and current grazing management practices are acceptable.	1. Has a potentially significant resource conflict, and current grazing management practices could be improved.	1. Has no significant resource conflicts, and grazing management practices are acceptable.
2. Has only a moderate potential for improvement in forage production (vegetative condition).	2. Has a high potential for improvement in forage production (vegetative condition), and an ecological condition rating of 50 or less.	2. Has a low potential for improvement in forage production (poor soils).
3. Has an ecological condition rating of 38 to 51 and an improving vegetative trend.	3. Has an ecological condition rating of 50 or less and a static or downward vegetative trend.	
4. Has an ecological condition of 51 or higher and a static or improving vegetative trend.		
Other Considerations Contains 30% or more public land or more than 1,540 public land acres.	Other Considerations Contains 30% or more public land or more than 1,540 public land acres.	Other Considerations Contains less than 30% public land or less than 1,540 public land acres.

Note: [a] Regardless of its size, any parcel of public land with an identified resource conflict qualifies for this category.

of the Interior's Wilderness Management Policy allows motorized and mechanized equipment to be used to maintain range improvements in wilderness when it is considered to be the minimum tool needed.

To provide guidance and procedures for this type of maintenance, the BLM in 1990 developed Range Improvement Maintenance (RIM) Plans. As stated in the plans, allottees may use motorized vehicles on preapproved routes to access improvements when the weather and ground are dry. In general (except in emergencies), the maintenance schedule is as follows: windmills annually (minimum), fences every 5 years, and dirt tanks every 10 years.

Livestock Grazing in the National Monument

In establishing the El Malpais National Monument, the Congress transferred to the National Park Service over 100,000 acres of public land formerly administered by the BLM as multiple use lands. P.L. 100-225 provided that livestock grazing in the monument could continue until December 31, 1997, under BLM administration. Now that such use has been discontinued in the monument, the BLM has adjusted all affected grazing permits to reduce livestock numbers. Appendix M shows the allotments on which this grazing has been discontinued.

TABLE 3-13

SELECTIVE MANAGEMENT CATEGORIES
FOR GRAZING ALLOTMENTS OVERLAPPING THE PLANNING AREA

Allotment Number	Allotment Name	Selective Management Category	Public Land Acres
201	Cerritos de Jaspe	M	9,138
202	Bright's Well	M	304
203	El Malpais	I	136,195
204	Raney	C	1,980
205	Los Pilares	I	13,998
206	Little Hole-in-the-Wall	C	320
207	Cerro Brillante	I	21,760
208	Loma Montosa	I [a]	7,520
209	Techado Mesa	I	35,099
210	Los Cerros [b]	I	40,109
211	Ventana Ridge	M [a]	3,013
222	Chical	C [c]	1,600
226	Arrosa	C	640
438	Monument Lake	C	3,200
439	La Vega	C	160
457	Palomas	C [c]	640
		Total	275,516 [a]

Notes: [a] Includes allotment acres that are outside the Planning Area.
[b] Combined allotment created in 1995 to include the former Cerro Chato (#200).
[c] Allotments created by the BLM as the result of a land exchange with the State of New Mexico in 1987.

TABLE 3-14

ACRES AND AUMS IN THE PLANNING AREA UNUSABLE FOR LIVESTOCK GRAZING

Allotment Number	Allotment Name	Unusable Acres	Unusable AUMs
201	Cerritos de Jaspe	10,235	1,821
203	El Malpais	45,429	2,949
204	Raney	7,912	-- [a]
205	Los Pilares	3,003	287
207	Cerro Brillante	346	15
208	Loma Montosa	7,476	284
209	Techado Mesa	9,335	958
210	Los Cerros [b]	11,431	492
211	Ventana Ridge	1,484	193
	Totals	96,651	6,999

Notes: [a] AUMs not calculated.
[b] Includes information for the former Cerro Chato Allotment (#200).

Riparian/Wetland Habitats

These habitats are areas of land directly influenced by permanent water, such as spring areas or streambanks. They have visible vegetation or physical characteristics that reflect this influence. Excluded from this definition are ephemeral (temporary) streams or washes that do not have vegetation that depends on free water in the soil.

Riparian areas are extremely limited in size and extent throughout the Planning Area. As such they are unique and extremely important, not only for many species of wildlife that are dependent on them, but also for maintenance of water quality, spring and streamflow, and forage production.

A few small riparian/wetland marshy areas occur around natural springs in the Planning Area. Cebollita and Cebolla are the best known springs; each provides enough water to form a small (less than 10-acre) riparian/wetland area with a small (less than 1½-mile-long) intermittent stream below it. In addition playa lakes, which are ephemeral (temporary) and dependent on annual precipitation, can resemble wetlands after large summer rainstorms.

Except for the small streams below Cebollita and Cebolla Springs, no perennial streams exist within the Planning Area. Runoff occurs only from high-intensity summer storms and occasional snowmelt. The majority of the area is a closed basin with no external water sources.

FIRE MANAGEMENT

Fire has played an integral role in the development of the Planning Area, which is made up of numerous plant communities that have developed as part of a fire-dependent ecosystem. Periodic burning of these plant communities allows their natural composition, structure and function to continue.

Historically, natural fires have occurred every 2 to 3 years or less within these ecosystems, burning an average of 500 to 2,000 acres per occurrence. In combination with other factors, recent, aggressive

fire suppression has significantly changed the plant communities from more open grasslands to shrub-grasslands and piñon-juniper woodlands. These shrub and woodland communities do not produce the fine fuels necessary to carry natural fires, so the natural cycle of vegetative change has been suppressed. This shift has also resulted in increased fuel loads, soil erosion, and a loss of ecosystem and biological diversity.

The BLM has an ongoing program of using prescribed fires throughout the lands managed by the Albuquerque Field Office, including the Planning Area. This prescribed fire program is used to enhance vegetative habitats for both wildlife and domestic livestock. It is also being used to help blend fire back into the natural process of a functioning ecosystem.

The agency prepares individual burn plans before using prescribed fires or wildland fires (under prescription) to improve the vegetative habitats of the Planning Area. (Otherwise, BLM policy requires that all wildfires be fully suppressed.) A state burn permit, including a smoke management plan, is also required to conduct prescribed fires in the New Mexico.

After this Plan Amendment/EIS is approved, the BLM will prepare a Fire Management Plan for the Planning Area to identify how fire will be used to protect, maintain and enhance resources and meet vegetative objectives. The fire plan will incorporate the management restrictions identified in this Plan Amendment/EIS that could stop unacceptable resource damage (e.g., no bulldozers in riparian areas).

LANDS & REALTY (INCLUDING BOUNDARY ADJUSTMENTS)

Land Ownership

The NCA makes up the majority of the Planning Area. In addition to the NCA land, the Planning Area includes lands acquired by the BLM since 1987 that are adjacent to the NCA, and lands needed to develop the CDNST. Acreages within the NCA and Planning Area are shown in Table 3-15.

P.L. 100-225 authorizes the acquisition of private lands and minerals within the NCA. The Congress intended that when the BLM seeks to acquire this private land, the consent of the property owner should be obtained. This consent requirement applies unless an imminent threat exists that the land is to be developed in a manner contrary to the purposes for which the NCA was established.

A combination of land protection methods is used to protect NCA resources on private land. As authorized by Sections 502 through 506 of P.L. 100-225, the BLM can acquire land or interests in land (i.e., mineral estate and conservation or scenic easements) by donation, purchase with donated or appropriated funds, exchange, and transfer from any other federal agency. Cooperative agreements can also be used to protect privately owned resources. As historical properties become available in the NCA, they are being evaluated for their historical, architectural, cultural and interpretive value.

Since 1987, the BLM has acquired about 193,700 acres of mineral rights in the NCA and the National Monument, 13,400 surface acres within the NCA, and 14,000 acres contiguous to the NCA. The National Park Service (NPS) has acquired approximately 7,000 acres within the National Monument. Acoma Pueblo has acquired approximately 320 acres within the NCA Neck Unit and 6,560 acres adjacent to the NCA.

Acquisition Priorities

The priorities and rationale for BLM acquisition of properties within the boundary of the NCA, as defined in the Land Protection Plan (USDI, BLM 1989b), are summarized below.

The first priority for acquisition, preferably by exchange, is all private subsurface interests within the NCA. Mineral development anywhere within the boundaries of the NCA is incompatible with the Congressionally mandated goals and purposes of the NCA. Federal minerals have been withdrawn, and acquisition of private minerals would provide the same protection to the non-federal parcels. The BLM has completed mineral exchanges and fee acquisitions with the principal subsurface landowners, the

TABLE 3-15

LAND OWNERSHIP WITHIN THE NCA AND PLANNING AREA [a]

Ownership	NCA		Planning Area	
	Acres	Percent	Acres	Percent
BLM	226,000	86.2	248,000	86.6
Private	34,300	13.2	36,500	12.8
Indian	1,800	.6	1,800	.6
Totals	262,100	100	286,300	100

Note: [a] As of January 1997.

New Mexico and Arizona Land Company, the Cerrillos Land Company, and the State of New Mexico. About 39,600 acres of private minerals remain within the NCA, but clear title information has been difficult to obtain for these inholdings. The remaining subsurface inholdings are located primarily in the Cebolla Wilderness, Neck, Brazo and Breaks Units.

The second priority for acquisition, preferably by exchange, includes all private inholdings and edgeholdings within and adjacent to the Cebolla Wilderness and West Malpais Wilderness. The Chain of Craters WSA contains no private surface, so no acquisition is needed.

Increased use on private lands within wilderness is incompatible with the goals and purposes for which the Congress designated them. Acquisition of private inholdings prevents any change in land use and improves the area's manageability, while acquisition of edgeholdings provides access.

Acquisition of the remainder of Cebolla Spring in T. 5 N., R. 10 W., Section 12 and associated riparian area in the Brazo Unit would ensure protection of a critical riparian area. The "Old Hughes Place," a historical homestead in the Brazo Unit, may merit preservation and is included in this priority. The BLM recently acquired all but four private edgeholdings and three inholdings in the Cebolla Wilderness, including a portion of Cebolla Spring and the private portion of the Pinole Site, and all but three inholdings in the West Malpais Wilderness. Two of the West Malpais inholdings (Sections 22 and 26, T. 7 N., R. 12 W.) are subdivided into 40-acre parcels, some of which have been sold to different landowners. The BLM is working to acquire both of these sections.

The third priority is acquisition of scenic and/or conservation easements along the federal, state, and county highways passing through the NCA. Commercial development and visual intrusions along the roadways (e.g., billboards) are incompatible with the goals and purposes of the NCA. Protection of the viewshed along NM 117 in the Neck Unit, the scenic gateway to the NCA, is most important. Also to be protected are the viewsheds along I-40 and NM 53 in the Neck Unit, and along portions of CR 42 in the Continental Divide Unit.

The fourth priority is the Acoma Exchange, if initiated by the Pueblo of Acoma. This exchange is mandated by P.L. 100-225 if requested by the pueblo, but to date, the Acomas have chosen not to pursue this option.

The fifth priority for acquisition is lands containing natural and/or cultural resources that require management or protection, and/or lands needed for visitor access and facility development. Where private uses are incompatible with NCA goals and purposes, or where important resources are on private land, acquisition may be the only feasible means of

protection. However, other options such as cooperative agreements and easements may be explored. Exchange is the preferred method of acquisition.

All private inholdings in the Brazo and Breaks Units should be acquired. The remaining portion of the Cebolla Spring riparian area and the Old Hughes Place are included above under Priority 2.

In the Cerritos de Jaspe Unit, important prehistoric cultural resources are threatened by uncontrolled excavation. The BLM would acquire these lands under Priority 5 if they were offered for sale or exchange by their owners.

Under this priority, the BLM would also acquire some private surface inholdings in the Continental Divide Unit from willing sellers. However, this does not include land in the heavily subdivided areas of the unit.

The sixth priority is protection of private land and resources within the NCA to benefit resources within the National Monument. Any development visible from CR 42 in the Continental Divide Unit would intrude on the natural scenic quality of the monument. Acquisition of scenic or conservation easements along CR 42 would protect the monument's viewshed.

An increase in the number of access roads into the subdivided areas within and west of the Continental Divide Unit of the NCA would also intrude on the natural scenic quality of the monument. The BLM and the NPS will work with Cibola County and local landowners to limit the number of access roads across the monument and the NCA, while still providing access from outside these protected areas.

The seventh priority is land on which no immediate threat to natural or cultural resources exists. As land becomes available in these other areas, they will be evaluated for their suitability for acquisition. Only exchange and sale proposals from private landowners that are in the best interest of the federal government and that meet the goals and purposes of the NCA will be pursued.

Potential NCA Boundary Adjustment Areas

The Acoma Tribe has requested that the boundary of the NCA be modified to exclude 800 acres owned by the pueblo before the NCA was established. This acreage is west of NM 117, between the highway and the monument boundary. The Congress' original intent was to encourage the tribe to exchange this land, then to include the 800 acres within the monument boundary. However, the Acomas have chosen to retain the land because it is part of their aboriginal claim area and has recurring value to them.

The Planning Area includes two parcels of public and private land that could be recommended for inclusion within the NCA adjacent to the Breaks and Brazo Units. An additional four parcels of public and private land located outside the Planning Area boundary could also be recommended for inclusion within the NCA (Continental Divide-AFO, Cerro Brillante-AFO, Techado Mesa-SFO, and Tank Canyon SFO). Table 3-16 summarizes the land ownership status within these proposed expansion areas, and Map 3 in Chapter 1 shows their boundaries.

Five of these parcels would add contiguous, predominantly public land containing key cultural and natural values. They are a logical extension of the NCA, and would enhance the manageability of the area. The sixth parcel would secure a treadway for the proposed CDNST route. A description of these six parcels follows. (Note: Any adjustment in the boundary of the NCA would require that the Congress amend P.L. 100-225.)

The first parcel, the Breaks Non-NCA Unit, includes 11,630 acres of formerly private land (acquired as part of the King Exchange), with 500 acres of private land remaining. This area is characterized by open grasslands with blue grama in sod-bound form, and shrubs such as fringed sage predominant. Part of this area is classified as having the sparse to bare vegetation type, which is extremely sensitive to climatic variation and surface disturbance. Historically and at present, these lands have been used for grazing.

Cultural resources on this parcel are extremely important. It contains a major portion of the prehistoric community associated with the Dittert Chacoan Archeological Protection Site (P. L. 96-550, as amended). In addition, a brief reconnaissance survey of a single section in the southern portion of this parcel yielded evidence of 12 masonry pueblos, suggesting the area contains one of the highest densities of pueblo sites in the region. These ruins are an extension of a prehistoric community that lies partially within the NCA to the north. As part of the NCA, this land would also provide a staging area for wilderness-based recreation activities, serve as a buffer between the Cebolla Wilderness and adjacent private land, and provide access into the Dittert Site and Homestead Canyon.

The second parcel, the Brazo Non-NCA Unit, contains about 10,400 acres of recently acquired private land, with 1,690 acres of private land remaining. This land has the same resources and values as the adjacent Brazo Unit of the NCA and can be most easily managed as a part of the NCA. Primary uses are grazing, hunting, piñon-nut picking, and access to the Cebolla Wilderness and other parts of the NCA.

The third parcel, the Cerro Brillante-AFO Unit, contains 3 to 4 miles of treadway for the CDNST. All of this parcel (2,030 acres) is privately owned land. Acquisition of either an easement or the land is required before the BLM could construct this segment of the trail or encourage its use.

The fourth parcel, the Continental Divide-AFO Unit, contains 1,960 acres of federal land but no private land. This land has the same resources and values as the adjacent Continental Divide Unit of the NCA and could be most easily managed as part of the NCA.

The fifth parcel, the Techado Mesa-SFO Unit, includes approximately 5,000 acres of public land managed by the BLM Socorro Field Office and 40 acres of private land that adjoin the Brazo Non-NCA Unit identified above. This scenic area contains rolling topography and a high, steep- sided mesa capped by lava flows. Vegetation is dominated by a ponderosa pine-oak mixed forest and piñon-juniper woodlands. Small playa lakes form seasonally on the mesa top. Visually and ecologically, the area is similar to the Brazo Unit of the NCA. Primary uses are

TABLE 3-16

LAND OWNERSHIP
OF PROPOSED NCA BOUNDARY ADJUSTMENT AREAS [a]
(acres)

Unit	BLM	Private	Total
Brazo Non-NCA	10,400	1,690	12,100
Breaks Non-NCA	11,630	500	12,130
Cerro Brillante-AFO [b]	0	2,030	2,030
Continental Divide-AFO	1,960	0	1,960
Tank Canyon-SFO	9,870	200	10,070
Techado Mesa-SFO	5,000	40	5,040
Totals	38,860	4,460	43,330

Notes: [a] As of January 1997.
[b] The BLM would seek to acquire an easement for the Continental Divide National Scenic Trail across this land.

grazing, watershed, wildlife, hunting, piñon-nut picking and scenic enjoyment.

Within this parcel are seven sections (4,350 acres federal and 40 acres private) in northeast Catron County and one section (640 acres federal) in northwest Socorro County managed by the BLM Socorro Field Office. The *Socorro Resource Management Plan* (USDI, BLM 1989d) classified these lands for retention "as needed in support of the El Malpais General Management Plan." The Techado Mesa parcel, if managed as part of the NCA, would enhance opportunities for semi-primitive motorized recreation and augment both wildlife and watershed management. It would also improve management by the BLM because Albuquerque Field Office personnel are frequently in the area because of its proximity to the NCA, whereas it is far removed from the BLM Socorro Field Office. The BLM Albuquerque Field Office already manages grazing allotments on this parcel under a cooperative agreement with the Socorro office.

The sixth parcel, the Tank Canyon-SFO Unit contains 9,870 acres of federal land and 200 acres of private land. It lies southwest of the Cebolla Wilderness and adjoins the recently acquired Breaks Non-NCA parcel described above. The Tank Canyon parcel is in Catron County and the federal lands are currently managed by the BLM Socorro Field Office. This parcel is slated for disposal in the Socorro RMP because the lands are isolated from other BLM-administered land.

The Tank Canyon parcel includes high densities of archeological sites that warrant intensive management. Among these is the Newton Site, a large, late masonry pueblo that is among the most important cultural resources in the region. The Tank Canyon area also includes well-preserved historical homesteads that were once part of a large, loose-knit community in the El Malpais region.

Most of the headwaters of Tank Canyon are contained in a scenic area of rolling topography. Vegetation is dominated by piñon-juniper woodlands, while wildlife values are similar to those in the Cebolla Wilderness.

Addition of the Tank Canyon area to the NCA would facilitate management of cultural resources, wildlife and watershed. It would also contribute more opportunities for semi-primitive, non-motorized recreation in the NCA.

Rights-of-Way & Land Use Permits

Within the Planning Area are portions of five state or county roads, NM 117, NM 53, CR 41, CR 42 and CR 103. Numerous unpaved roads and routes are used by the general public, grazing allottees, and private landowners. The BLM has issued several rights-of-way within the Planning Area for roads, telephone and powerlines. Along I-40, adjacent to the Planning Area for approximately 5 miles, is a major right-of-way/utility corridor identified in the Rio Puerco RMP. No designated utility corridors exist within the NCA or Planning Area.

Although no temporary land use permits are currently authorized within the Planning Area, they could be in the future as long as they did not conflict with the goals for which the NCA was established. An example is a permit for commercial filming.

MINERALS & PALEONTOLOGY

Minerals

P.L. 100-225 withdrew public lands in the NCA from the mining, mineral leasing and geothermal leasing laws, subject to existing rights. No grandfathered mining claims, mineral or geothermal leases exist in the NCA. The law authorizes the BLM to acquire the mineral interests for public lands in the NCA and the National Monument. It also specifies that as private lands are acquired within the NCA, the mineral rights are also acquired, and these lands are automatically withdrawn from mineral entry. Since establishment of the NCA, the BLM has acquired 62,221 acres of mineral rights there. Approximately 40,000 acres of privately owned minerals remain in the NCA. Additional Planning Area lands have been acquired outside the NCA boundary; these are presently open to mineral development.

Paleontology

Although the Planning Area has not been surveyed for paleontological resources, reports of vertebrate fossils in the northernmost section have been

confirmed. In addition to the Jurassic Age Morrison Formation, potential for paleontological resources exists in certain other geologic formations within the Planning Area. Formations such as the Todilto, Dakota, Mancos Shale, and Crevasse Canyon are known elsewhere to contain fossils ranging from fish to dinosaurs, certain marine invertebrates and plants. In other parts of the Planning Area, features and fissures within the older lava flows as well as certain sedimentary rocks may contain animal and plant material that have accumulated over thousands of years. This zoological and paleontological material could provide information about the area's past climatic conditions, plants and animals.

SOCIAL & ECONOMIC CONDITIONS

For purposes of economic and social analysis, the primary influence of the Planning Area is within Cibola County, which is the focus of this section. (Use of the Planning Area's resources and facilities, however, has broader influences. People from Albuquerque pursue outdoor recreation and hobby interests there, and tourists from many parts of the U.S. as well as foreign countries visit La Ventana Arch and other natural resources.)

Cibola County was created by a division of Valencia County in 1981, so data for the new county before 1981 are estimated. In 1970, the county's pop-ulation was 20,125, rising to 30,109 in 1980 and falling to 23,794 in 1990. These population changes were mainly related to uranium mining activity in the area.

The multiethnic nature of the population creates diversity in the community and its values. The figures in Table 3-17 show the ethnic distribution of the population.

Employment and income figures for the county are shown in Tables 3-18 and 3-19. While figures for total employment showed an increase between 1985 and 1994, little change occurred in the portion of private-industry employment as compared to government employment. Farm employment numbers (expressed as a percentage of the area's total jobs) decreased slightly, while private industry showed a reduction in mining jobs and increases in retail trade

TABLE 3-17

CIBOLA COUNTY POPULATION BY RACE AND PARTIAL ETHNIC ORIGIN, 1980 & 1990

	1980		1990	
Population Category	**Number**	**Percent**	**Number**	**Percent**
Female	15,184	49.94	12,140	51.02
Male	15,218	50.06	11,654	48.98
Total	30,402	100	23,794	100
Race/Ethnic Origin American Indian, Eskimo, Aleut	7,852	25.83	9,155	38.48
Asian or Pacific Islander	64	.21	81	.34
Black	165	.54	191	.8
Other Race	3,847	12.65	468	1.97
White	18,474	60.77	13,899	58.41
Hispanic Origin	11,249	37	8,109	34.08
Non-Hispanic White	7,212	23.72	6,491	27.28

TABLE 3-18

**CIBOLA COUNTY EMPLOYMENT BY INDUSTRY,
1985 & 1994**

Industry	1985		1994	
	No. of Jobs	Percent of Total Jobs	No. of Jobs	Percent of Total Jobs
Farm	254	4.86	282	3.88
Non-Farm [a]	4,971	95.14	6,978	96.12
Private (Total)	3,471	66.43	4,878	67.19
Agricultural Services, Forestry, Fisheries & Other	37	0.71	48	0.66
Mining	241	4.61	320	4.41
Construction	193	3.69	283	3.9
Manufacturing	233	4.46	388	5.34
Transportation & Public Utilities	329	6.3	317	4.37
Wholesale Trade	103	1.97	190	2.62
Retail Trade	1,070	20.48	1,525	21.01
Finance, Insurance & Real Estate	303	5.8	352	4.85
Services	962	18.41	1,455	20.04
Government & Government Enterprises (Total)	1,500	28.71	2,100	28.93
Federal--Civilian	176	3.37	438	6.03
Federal--Military	124	2.37	105	1.45
State & Local	1,200	22.97	1,557	21.45
Totals [b]	5,225	100	7,260	100

Notes: [a] Sum of the Private (Total) and Government/Government Enterprises (Total) categories.
[b] Sum of the Farm, Private (Total) and Government/Government Enterprises (Total) categories.

and services. (These latter two sectors include jobs in the recreation and tourism industries.) The 1994 Cibola County civilian labor force was reported at 9,658, of which 8,766 were employed and 892 were unemployed, for an unemployment rate of 9.2 percent. (New Mexico's overall unemployment rate is 6.3 percent.)

Total personal income in the county increased by approximately 50 percent between 1985 and 1994. Per-capita income increased from $6,856 in 1985 to $10,793 in 1994. Earnings from mining (as a percentage of personal income) increased slightly, and were also higher in retail trade and services. During the period, earnings from government employment increased by 115 percent.

Cibola County residents are interested in the creation of a higher standard of living through the development of jobs and income. American Indian use of the Planning Area's resources for traditional cultural purposes is another important social factor. The rural setting and ranching lifestyle are also highly valued by a portion of the population.

SOIL, WATER & AIR RESOURCES

Soils

The Planning Area is within the Cibola County Soil Survey area (USDA, SCS 1993). Most of the soils in the area are moderate to fine textured. Soils on the older basalt flows and steep mesa sideslopes are very stony or cobbly. Rock outcrops, including those with minor amounts of soil, form large portions of the landscape along the mesa fronts and basalt flows. Except on the steep mesa slopes, most soils in the Planning Area have a low to moderate runoff and erosion potential.

Gully erosion in valley bottoms such as Cebolla and Sand Canyons follows the historical pattern found throughout the west, where a changing climate and expanding settlement helped to initiate another arroyo cut-and-fill cycle. (In these cycles, arroyos develop and then fill back in over several hundred years.) Surface runoff and sediment flows are contained in small closed basins against the lava fields.

Water

Several areas within the Planning Area have small springs. Cebollita and Cebolla Springs provide enough water to create small riparian/wetland areas. These springs are used by livestock and wildlife.

No perennial streams exist in the Planning Area, except for the 1 to 1½ miles of flow below Cebolla and Cebollita Springs. Overland flow only occurs as runoff from high-intensity summer storms and occasional snowmelt. For the most part, the Planning Area is a closed basin, with precipitation remaining in the area until it soaks into the ground or evaporates.

The San Andres-Glorieta Formation is the major subsurface source of water. Aquifer yield is extremely variable. Depth to groundwater ranges from 200 feet or less in the valleys and plains to more than 500 feet in other areas. Areas in which igneous rocks predominate do not transmit significant amounts of water and are not considered to be aquifers.

The quality of groundwater in the region is usually good enough for livestock and domestic use. Additional water sources for livestock include stock tanks and windmills. Most windmills are drawing from shallow alluvial aquifers that provide enough water to meet livestock demands.

The Ranger Station is the only site in the Planning Area with a public water supply, which is tested according to New Mexico Water Quality Control Commission regulations. The right to use water is established by state and federal laws. The BLM is a participant in a water rights adjudication that includes most of the Planning Area.

Air

The Planning Area is designated a Class II airshed under the 1977 Clean Air Act (refer to the Glossary). This airshed meets all New Mexico and federal air quality standards.

The open landscape in the Planning Area makes alteration of its airshed very apparent. Wildfires are the most common source of air-quality deterioration.

TABLE 3-19

CIBOLA COUNTY PERSONAL INCOME BY MAJOR SOURCE, AND EARNINGS BY INDUSTRY

Category	1985			1994		
	Number	% of Personal Income	% of Earnings by Industry	Number	% of Personal Income	% of Earnings by Industry
Total Personal Income [a]	174,376	100		264,448	100	
Non-Farm Income	172,475	98.91		262,639	99.31	
Farm Income	1,901	1.09		1,809	.68	
Population (thousands)	25.4			24.5		
Per-Capita Personal Income (dollars)	6,856			10,793		
Derivation of Total Personal Income Earnings by Place of Work	72,267	41.44	100	147,804	55.89	100
Less: Personal Contribution for Social Insurance	4,610	2.64		9,273	3.51	
Plus: Adjustment for Residence	54,797	31.42		39,008	14.75	
Equal: Net Earnings by Place of Residence	122,454	70.22		177,539	67.14	
Plus: Dividends, Interest & Rent	15,375	8.82		16,556	6.26	
Plus: Transfer Payments	36,547	20.96		70,353	26.6	
Components of Earnings [b] Wages & Salaries	55,329	31.73	76.56	111,415	42.13	75.38
Other Labor Income	6,117	3.51	8.46	18,007	6.81	12.18
Proprietor's Income	10,821	6.21	14.97	18,382	6.95	12.44
Farm	1,237	.71	1.71	410	.16	.28
Non-Farm	9,584	5.5	13.26	17,972	6.8	12.16
Earnings by Industry Farm	1,901	1.09	2.63	1,809	.68	1.22
Non-Farm	70,366	40.35	97.37	145,995	55.21	98.78
Private	48,462	27.79	67.06	98,740	37.34	66.8
Agricultural Services, Forestry, Fisheries, & Other	152	.09	.21	437	.17	.3
Mining	9,385	5.38	12.99	19,204	7.26	12.99
Construction	2,467	1.41	3.41	6,603	2.5	4.47
Manufacturing	3,706	2.13	5.13	9,896	3.74	6.7
Nondurable Goods	662	.38	.92	654	.25	.44
Durable Goods	3,044	1.75	4.21	9,242	3.49	6.25
Transportation & Public Utilities	7,288	4.18	10.08	10,048	3.8	6.8
Wholesale Trade	1,488	.85	2.06	4,661	1.76	3.15
Retail Trade	11,664	6.69	16.14	21,180	8.01	14.33
Finance, Insurance & Real Estate	1,713	.98	2.37	2,649	1	1.79
Services	10,599	6.08	14.67	24,062	9.1	16.28
Government & Government Enterprises	21,904	12.56	30.31	47,255	17.87	31.97
Federal--Civilian	3,632	2.08	5.03	15,064	5.7	10.19
Federal--Military	631	.36	.87	811	.31	.55
State & Local Government	17,641	10.12	24.41	31,380	11.87	21.23

Notes: [a] Income by place of residence.
[b] Earnings by place of work.

The lava flows of El Malpais have the highest occurrence of lightning- started fires in the region. Fires are usually less than 100 acres in size, and their smoke briefly impacts air quality.

VISUAL RESOURCE MANAGEMENT

The landscape composition of the Planning Area is quite diverse. The area has a wide variety of landforms; the steepness of slopes varies radically and frequently within short distances. The Planning Area includes interesting and distinctive geologic features that vary from volcanic plugs and cinder cones to cliffs and mesas formed of sandstone, to wide valleys and low, broken and rolling hills. Vegetation in the Planning Area is as variable, ranging from grass, shrubs and piñon-juniper woodlands to ponderosa parklands and deciduous groves of oak and aspen. Natural features such as the dramatic La Ventana Natural Arch, the colorful sandstone bluffs, cinder cones and lava flows are dominant features in the landscape. The contrasts in the basic elements of form, color, and texture in these landform and vegetation features provide a pleasing visual variety that contributes to the area's high-quality scenic value.

Views in the Planning Area are of broad panoramas of open forests, volcanic fields, the sandstone bluffs rising above the flows on the eastern side, and cinder cones on the western side. Past management activities and human uses of the area have not created dominant modifications to the landscape. Visitors have views from the cinder cones and bluffs overlooking the Planning Area, as well as from paved roads NM 117 and NM 53. Other portions of the Planning Area can be seen from county and local roads that provide access. When marked, a segment of the CDNST will also cross the Planning Area.

Table 3-20 displays the amount of public land acreage in the Planning Area in each Visual Resource Management (VRM) Class. The VRM class for the two wildernesses is Class I. The Chain of Craters WSA is being managed under VRM Class II objectives. The remaining lands, except for those acquired within the Planning Area since the completion of the Rio Puerco RMP (1986), lie within VRM Class I, II or III, as shown on Map 14. (Note: Unless these recently acquired lands within the Planning Area fall within the boundary of the NCA, they are not assigned a VRM Class.)

Visual resources on the BLM lands that adjoin the southeast corner of the Planning Area are managed by the Socorro Field Office as VRM Classes III and IV (USDI, BLM 1989c). They will continue to be managed according to the prescriptions for these classes in the Socorro RMP. (Appendix E explains the BLM's VRM system and management objectives for each class.)

TABLE 3-20

VISUAL RESOURCE MANAGEMENT CLASSES IN THE EL MALPAIS PLANNING AREA [a] (public land acres)

Area	Class I	Class II	Class III	Unassigned	Totals
NCA	125,130	86,760	14,110	0	226,000
Planning Area (outside NCA)	0	0	0	22,000	22,000
Totals	125,130	86,760	14,110	22,000	248,000

Note: [a] No Class IV areas exist in the Planning Area.